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VARLEY'S ELECTRIC DIVINING ROD.

The other day I described the divining bottle for which a British patent had been issued to Mr. GOODMAN, farmer, of Texas. The electric divining rod, which is the subject of United States Patent No. 277,087, dated May 8, 1883, and granted to CROMWELL FLEETWOOD VARLEY, of England, might seem from its name to be a companion piece for the divining bottle. But an examination of Mr. VARLEY'S patent reveals at once that it does not belong in the category indicated by its title. For, through many centuries and through innumerable variations in the construction and employment of divining apparatus, the invariable feature (I think, the only invariable feature) of all such devices has been that they require a human operator, of whose personal skill or "gift" they are only the mechanical tools and indicators. Celestial guidance, demoniac possession, animal magnetism; odyllic force, unconscious nervous or muscular action, special sensitiveness to moisture, temperature, electricity and what not, imagination, deliberate fraud—in short, whatever has been the adopted theory of operation, the operator has always been a necessary part of it.

Now, Mr. VARLEY'S divining-rod is simply an apparatus for determining, by means of a rotating rod, helices, galvanometer, etc., the presence and direction of feeble electrical currents in its neighborhood. It is not necessary to give a detailed description of the instrument itself, or to attempt to decide whether it is novel, or better than many other applications of the galvanometer for similar purposes. The inventor, Mr. VARLEY, is an electrician of some note, and, on that side of the problems involved, is no doubt both experienced and intelligent. He declares that his invention is "also applicable to other useful purposes," besides the discovery of "metallic lodes." It is, in fact, a voltaic induction-balance, on the principle of the apparatus of Professor HUGHES, one form of which, BELL'S instrument for discovering the position of a bullet hidden in a human body, became famous in connection with the case of President GARFIELD.

Unfortunately there is no evidence that such electrical currents as this apparatus could determine are present in lodes or ore bodies. The results of experiment so far are decidedly unfavorable to such a hypothesis. And the subject has been explored, with periodic activity, for a good many years. The famous papers of FOX, which may be said to have begun the scientific inquiry, were presented to the Royal Society in 1880, and the articles of REICH, which appeared in 1839 and 1844, aroused a very general interest. Yet, after the latter date, little more was done, except in the way of unsatisfactory tests here and there, the results of which indicated that there was nothing of practical value for prospectors and miners in the supposed electrical phenomena of ore deposits.

For a general survey of the subject with reference to its earlier literature, and an account of recent careful experiments, the paper of Mr. CARL BARUS [*Trans. Am. Inst. of M. E.*, xiii., 417] may be consulted with advantage. Mr. BARUS says there is little doubt that whatever currents are observed in connection with ore bodies are of hydro-electric origin—that is, they are set up by the action of materials in contact with moisture, like the currents of the voltaic pile. Some ores probably behave in this respect like metals; and it appears that different ores have widely differing capacity for such action. One might almost say, as a sufficient summary of the whole matter, that the electric activity of an ore body would probably vary with the actual amount of chemical change going on within it. Yet electrical activity not previously existing may be set up by the experimenter, if he applies his terminals of copper and zinc to the rock itself. On the other hand, the attempt to discover, by means of induction, without such contact, currents supposed to be already active in the neighboring rock, seems utterly vain.

Mr. BARUS'S method involved the use of terminals, and he guarded against errors of observation and of inference with much ingenuity. The results of his work in the Comstock mines and at Eureka are suggestive and interesting; but they do not afford encouragement for the belief that electrical means will ever become practically useful in the discovery of ore-bodies. He had to make very numerous observations with the most sensitive instruments; and he reports that "the electro motive forces met with are invariably small," and frequently so small as to be only just measurable. A diamond drill would get more accurate information at smaller cost than these microscopic determinations of forces, each of which is many times smaller than the effects of those accidental errors of adjustment or reading to which the operator under ordinary working conditions would be inevitably liable. The accomplished members of the United States Geological Survey, with their apparatus and assistants, profitably make electrical tests underground, in search for scientific knowledge. They are not likely to prove cheap employes in search for ores.

Moreover, as was pointed out half a century ago, the electrical indicators, even if certain in action, could make no distinction between worthless and valuable ores, or between base and noble metals. They would be as likely to lead the operator to disappointment as to success. If they led him at all, he would have to follow by boring or digging; and the situation is expressed, after all, for these inventions, as well as for the earlier and more superstitious divining rod, by that significant word

cut in old AGRICOLA's book, which shows the diviner, solemnly pacing, witch-hazel in hand, toward a vein of ore—and a couple of sturdy diggers, already at work on the vein, which they have discovered without any mysterious aid. AGRICOLA's text confirms the symbolism of his picture, intimating his belief that on the whole the pick-axe "gets there first." The skillful and prudent miner, he says, will select, according to the indications of nature, a suitable place for exploration, and *ibi metallicus agit fossas*—"there the miner digs."

R. W. R.

WHERE IS THE PARADOX ?

"What a paradox the ENGINEERING AND MINING JOURNAL is—a newspaper drawing its support largely from the mining interests of the West, which persistently lends its great influence to the depreciation of the products of the industry on which it lives! When we say that this is a feat that no other journal ever accomplished, we simply pay a very high tribute to the ability and success of the ENGINEERING AND MINING JOURNAL. It is a great newspaper in its world-wide field, and for that reason all the more a blighting pestilence to the men of the West who give it their support."—*Mining Age*, Denver, Colo., May 28.

Our esteemed contemporary bases its criticism on false premises when it says of the ENGINEERING AND MINING JOURNAL, "it lends its great influence to the depreciation of the products of the industry on which it lives," and its conclusions are necessarily erroneous.

There is no paradox whatever in the course of the ENGINEERING AND MINING JOURNAL; it advocates what we are thoroughly convinced is for the best interests of the country and of the mining industry, and, moreover, the great majority of the people of this country agree with us, as is evidenced by the actions of both political parties. Neither is there any mystery about the grounds for our belief in the utter madness of the demand for free coinage. It has been demonstrated, and is not denied by any sane man, that with free coinage of silver dollars, worth in gold 60 or 70 cents, gold will disappear from circulation, for both gold and silver did actually disappear when we made the still cheaper currency of "greenbacks" and "shinplasters," and it has disappeared in every country that to-day has free coinage of silver. Therefore our circulating medium would be suddenly and largely contracted, instead of expanded, as the free coinage advocates pretend.

Every civilized country that had free silver coinage and has abandoned it refuses to re-enact it, and every country that still has it is striving to get rid of it and to get onto the gold standard that alone is good and current all the world over. Is it wisdom or madness to wish to adopt what the whole civilized world has either discarded or seeks to discard, and to throw away what the wisdom of the whole world agrees to be most desirable to get and to keep?

Is it honest? Is it desirable to pay our wage-earners for their labor in dollars worth 60 or 70 cents and allow our rich men and lenders of money (like hypocritical Senator STEWART of Nevada) to exact from them payments of loans and interest in gold? Is it to the interest of our wage-earners, our miners, farmers, factory hands, etc., that is, of ninety-nine one-hundredths of our people, to receive for what they have to sell, whether labor or the product of labor, 60 cents in gold value for a dollar, and at the same time be obliged to pay in dollars worth 100 cents gold value for much of what they buy?

Is there any intelligent "student of markets" in the whole world that does not know that the price of any commodity is dependent (except in the case of temporary corners, trusts or combinations) on the supply of and market demand for the article, and yet with the adoption of free coinage the chief demand for silver, which now takes and pays in gold for 54,000,000 oz. a year or nearly 40 per cent of the whole world's output, will suddenly cease. In the absence of any purchaser willing to pay gold for it the gold value of silver will inevitably decline to a lower point than ever yet known. The accumulated stock of the world would come here to buy our gold, while it could do so without too heavy a discount, and afterward to buy our surplus wheat, corn and cotton, our copper minerals and manufactures. Everyone knows that it is the price at which this surplus can be sold in the gold-paying markets of the world that regulates our home prices except as the natural law is deflected by tariffs, "corners" or combinations, and consequently every one should know that our producers and wage earners must get less and less for their labor as the silver dollar in which they are paid continues to decline in actual gold value.

No civilized country can live alone at this late day, and the nation that debases its currency simply imposes that much of a tax on all its transactions with the rest of the world.

During the last fiscal year the United States exported something over \$1,000,000,000 worth of merchandise. If, in accordance with the universal experience of the world, the adoption of free coinage would bring us to the single silver basis, and that the price of silver, deprived of its only large market, would decline to, say, one-half its present coining value, then would we be obliged to produce that \$1,000,000,000 worth of merchandise at about one-half what it now costs as measured in silver.

And not that alone, for our home market being regulated by foreign

prices, the values here, though possibly higher in silver than they now are, would inevitably decline, as measured by the universal standard, and to this standard we would ultimately have to return, though it would only be through years of disaster. The single silver standard, which is inevitable with free coinage, would, therefore, necessarily lower the gold value of wages in every industry in the country.

These statements are based upon the universal experience of the rest of the world, and cannot be answered by calling the ENGINEERING AND MINING JOURNAL "a blighting pestilence," as does the *Denver Mining Age*, or by calling "its editor a knave or a fool," as does the *Colorado Mining Gazette*, and as many other Western papers, which vary the invectives, but not the spirit of their notices.

The ENGINEERING AND MINING JOURNAL arrives at its convictions by careful study of the markets of the world and of the history of nations; and it advocates what its editor firmly believes to be for the best interests of the mining industry and of our whole beloved country.

Our opinions being based on what we believe to be the truth, are firmly held; but since we make no claim to infallibility, and recognize the right and duty of every man to change his belief as better light shows more clearly what is the truth, so are we open to conviction.

The ENGINEERING AND MINING JOURNAL has but a single aim, to secure the adoption of that which is right and honest and for the good of the country and the benefit of the industries it represents. Its advocacy of or even its silence concerning what is dishonest or what it believes to be injurious to the interests it seeks to serve cannot be purchased even by the bribe of temporary popularity. This is its well founded boast.

If our contemporary wants to find the solution of its "paradox," that the ENGINEERING AND MINING JOURNAL steadily increases its circulation and influence while advocating what may be unpopular, it is readily found in the innate respect and admiration that men everywhere, and especially our brave, fearless and intelligent men of the West feel for those who have "the courage of their convictions," who cannot be bought, who advocate what they believe to be right, even though it may be temporarily both unpopular and injurious to their own interests. It is true that the ENGINEERING AND MINING JOURNAL would receive less abuse and possibly might have more admirers in the West if it advocated free silver coinage at present, but there are very few men in this enlightened country and age so narrow-minded as to wish to remain ignorant of what others think or so bigoted as to desire to hear only their own opinions repeated. Every fair and honest man hates cant and humbug and venality, and can respect an honest opponent; consequently, the ENGINEERING AND MINING JOURNAL continues to succeed and to increase its circulation and influence even among intelligent free coinage advocates. Moreover, can our critic remember any case in which the unpopular cause which the ENGINEERING AND MINING JOURNAL has advocated aggressively has not eventually won the day and public approval?

Our Western contemporaries will in due time, and before long, find new "paradoxes," and being fair and broad minded will, we doubt not, say "What a paradox! that men who have only their labor or its product to sell should have clamored so loudly and unanimously to be paid for it in dollars worth 60 cents everywhere else in the world, while at the same time they have to pay the rich their loans in gold dollars worth 100 cents!!" This is indeed a paradox—a standing marvel.

RECENT PUBLICATIONS.

THE SYSTEM OF MINERALOGY OF JAMES DWIGHT DANA, 1837-1868. DESCRIPTIVE MINERALOGY. Sixth Edition. By Edward Salisbury Dana, Professor of Physics and Curator of the Mineral Collection, Yale University. New York, 1892. John Wiley & Sons. 1134 pages, large octavo. Price, \$12.50.

I remember well the hearty admiration with which such veterans as Cotta, Breithaupt and Weisbach spoke, some 30 years ago, of Dana's *Mineralogy*, then in its fourth edition. They did not find in it radically new theories or classifications. On the contrary, it was characterized by a conservative eclecticism, in which, not the author's fancy, but the student's convenience, was the controlling motive. This peculiarity, I fancy, enhanced the praise bestowed upon the book; for the wonderful American had not only surpassed the patient Germans in the laborious accumulation, verification and arrangement of facts, new and old, but had foreborne to inscribe upon the monument erected by his industry, any revolutionary "fads" or fancies of his own.

This characteristic has been retained in all editions of the work; and the sixth edition, prepared by Prof. Edward S. Dana, under the advice of his distinguished and venerable father, is, like its predecessors, not a text book, but a dictionary, in which all other considerations give way to the supreme purpose of completeness, accuracy and convenience in use. The introduction matter is both terse and clear, sufficing completely, yet sufficing only, to enable the reader to comprehend the crystallographic and other notation employed in the volume, and, to some extent, in other modern authorities which he may be likely to consult. The result of this carefully studied brevity is the saving of space for the essential purpose of the work.

This sixth edition has been rewritten throughout and enriched by the addition of the discoveries of the 24 years which have elapsed since the appearance of the fifth edition. Such mineralogists as the two Danas and Brush are not likely to have missed many important recorded facts and I have noticed but one omission of significance, namely, that of the

occurrence of petroleum in Colorado. I do not find this mentioned, either under the head of Petroleum or in the supplementary List of American Localities.

The number of distinct and definite species catalogued and described in this edition (apart from the hydrocarbons, which are not numbered because not fixed in distinctive characters), is 824—a very moderate total, under the circumstances. The Index of Mineral Names at the end of the book, including synonyms in German, French and other languages as well as English, contains between 4,000 and 5,000 titles; and the greater part, I think, is composed of the names of alleged species which have been classified here as varieties merely. We ought to be grateful to Prof. Dana for this wise resistance to the unnecessary multiplication of species, the tendency toward which is, perhaps, more pronounced to-day in mineralogy than in the biological sciences, which, under the influence of Darwin's theory, have come to give greater weight to relationships than to differences.

After all, a mineral species is totally different from a vegetable or animal one. Its relations to other species of similar chemical and physical character are not genetic. It cannot be distinguished from a variety by any such feature as the intersterility which characterizes biological species. Nor has it ever, so far as I am aware, been found possible to apply, with perfect logical consistency, any rule, enforcing as to mineral species critical tests more deeply founded in nature than those which distinguish mere varieties. The lamented Sterry Hunt proposed, not long before his death, an elaborate classification of this kind; but he died without finishing the detailed descriptive mineralogy which alone could have obtained for his system the verdict of practical use; and consequently, like many other attempts in the same direction, it is likely to remain a mere suggestion for the future. Meanwhile, what we want for daily use is simplicity and convenience, rather than rigorous logic, so long as all these excellences cannot be combined; and I am glad that Professor Dana has kept the number of his species within moderate limits, not so much for purely scientific reasons as because he has thus delivered us from the bewildering complexity which would have been, after all, no more scientific.

That this opinion is quite disinterested may be inferred from the fact that I find among the obscure varieties (and condemned, moreover, as scarcely even a variety) a name which I suggested years ago to Prof. J. D. Dana, accompanying the suggestion with a specimen of the alleged new mineral. He refused at that time to concede to it any individuality; but a foreign journal subsequently published a description of the mineral, written by my German assistant, and Dana was obliged to take notice of this publication. I now think he was perfectly right, both in denying the specific character of the mineral and in including the name in his book, after it had once been published upon reputable authority; for it is sometimes as important to the student to know that an alleged new mineral is not acknowledged to be such as to know anything else about it.

The book shows throughout the evidences of the minute revision, amounting to a reconstruction, to which it has been subjected. As a matter of course, in the making of entirely new plates some typographical errors have been committed. I have noticed perhaps half a dozen, but none of sufficient importance to be mentioned here. I shall take pleasure in sending to Professor Dana, as I hope every other reader of his book will do, notice of such flaws as I may observe in my use of it. We certainly owe as much as this in the way of assistance to a man who has brought so great an undertaking so near to perfection, for the benefit of us all.

CORRESPONDENCE.

We invite correspondences upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

All letters should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

New Rapid Method for the Determination of Phosphorus in Iron, Steel and Ores.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Will you have the kindness to correct the following errata in my article on "New Rapid Method for the Determination of Phosphorus in Iron, Steel and Ores" in your issue of May 28th:

Paragraph 4, page 572, reads "standard hydrate solution;" should read "standard sodium hydrate." No. 8, page 572, reads in second line "potassium nitric," should read "potass. nitrate;" the same in seventh line "filtrate" should read "titrate;" No. 14, page 573, in first line, "ammonia," should read "ammonium;" No. 15, page 573, reads in first line "15.4 gm. sodium hydrate," should read "15.4 gm. sodium hydrate;" No. 15, page 573, reads in thirteenth line "60 cc. of water," should be "the necessary amount of;" No. 15, page 573, reads in fifteenth line "60 cc. of water," should be "an equal quantity."

PITTSBURG, Pa., June 1st, 1892.

JAMES O. HANDY.

Refuse in Anthracite Coal Beds.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR—I think that if Mr. Griffith had stated in his interesting article on the above subject, published in the issue of the ENGINEERING AND MINING JOURNAL of May 7th, just what he meant by the word "refuse," it would have added much practical value to it. For my part I don't know whether he means "slate" only, or whether "bony" and "sulphur" are added; or even if he includes the *culm* thrown away at the breakers, but I presume not. Another point occurs to me in this connection, which is this: What constitutes a "coal bed?" Do Mr. Griffith's figures relate only to the average or usual thickness worked or mined, or to the full thickness or total aggregate of different or separate layers or benches running in the coal-seam?

Again, I should like to ask him upon what grounds he or other geologists suppose the anthracite beds to be of earlier origin than the bituminous beds (presumably of Pennsylvania?) and where the evidence, if any has been published, can be found?

Unquestionably the points brought up by Mr. Griffith are of much interest, but comparisons cannot be properly made unless one knows exactly what "refuse" is intended to mean.

As bands of "bony" and of "slate" in anthracite as well as in bituminous coal don't readily separate from the coal in which they are interstratified or embedded, considerable *good coal* is thrown away in the shape of

"refuse" in practical mining. Does Mr. Griffith include good coal lost adhering to slate, etc., in his percentages?

ERIE, Pa., May 9, 1892.

W. S. GRESLEY.

Carbon Deposition in Fire-Brick.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The above article in your issue of May 21st has been somewhat marred by a typographical error, which is best corrected by an amended reproduction of the original sentence, viz.:

"Nevertheless, deposits of the latter (carbon) do form in the brick linings of blast furnaces, when the brick is not too hot. These formations, must, however, not be ascribed to the presence of converted pyrites, but to particles of iron derived from ferric hydrate obtained in the clay, or also to chips from the crusher in which the clay was ground."

While thus engaged in reviewing my article, I may as well add some explanations for those who are not conversant with the peculiar working of blast furnaces.

By them, the question might be put: If the brick is too hot—at the temperature at which ferrous sulphide can become completely desulphurized—for the deposition of carbon, how is it that carbon should deposit in brick that becomes ruptured by the sudden expansion of free silica, considering that the sudden expansion of free silica only takes place at a temperature nearly as high, or even higher, than that at which the complete desulphurization of pyrites can occur?

The explanation is very simple:

On account of the irregular "going down" or "settling" of the burden of the blast furnace, it frequently happens that the burden stands quite far off from the lining at some particular spot, while it may lean against the lining in the opposite direction. Thus temporary air-shafts are created, and if the air from one of the tuyeres should find such a shaft to be the path of least resistance, then the combustion of CO to CO₂, caused by its passage, may heat the contiguous fire-brick, temporarily, to a white heat and thereby force the sudden expansion of the free silica of the brick. That same brick may thereafter again become cool enough to allow the deposition of carbon.

The conversion of ferrous sulphide is quite a different matter, inasmuch as it is dependent on the co-operation of three factors—free oxygen, temperature and time. A sudden burst of an intensely hot oxidizing flame on a fire-brick would not desulphurize the sulphides within, but merely scorchify them.

A. D. ELBERS.

HOBOKEN, N. J., June 1st, 1892.

Sicilian Sulphur Mines.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In your issue of March 5th, 1892, appears an article on Sicilian sulphur mines, taken from the consular reports, which contains a number of mistakes which should be corrected.

In the first place, the statement that "for want of outside capital, which cannot be induced to invest in any undertaking on the island, the mining and fusing is still carried on in the most primitive fashion," is erroneous. That not a great amount of machinery is employed is due in a great measure to the small size of the mines and their slight depth; yet on the large ones there is some valuable machinery, requiring no insignificant expenditure on the part of the enterprising owners. During 1890 thirty steam pumps were employed, and 20% of the product was raised by steam hoists, the number of which is constantly increasing as the mines grow deeper.

The Sinopoli furnace for the treatment of sulphur mineral was built in 1878. Experiments were made, but as they were not so successful as was expected by Engineer Mattura, eventually it was abandoned.

According to the report of the Italian Mining Service for 1890, the production of sulphur for that year was divided as follows: From Calcaroni, furnaces, 263,424 tons, or 13.472% of the ore; from Gills furnaces, or similar communicating cell furnaces, 38,783 tons, or 13.637% of the ore; from the steam process, 18,868 tons, or 15.363% of the ore; from the distillation process, 213 tons, or 23.406% of the ore; by natural fires in mine, 3,790 tons, or 23.406% of the ore; native pure sulphur, 2,946 tons; a total production of 328,024 tons.

In 1891 the direct distilling process was abandoned and at present there are practically but three systems employed in reducing sulphur ores: the Calcaroni communicating cells system and the steam distillation apparatus.

The average cost of production in 1890 was as follows in lire for 1,000 kilos (one metric ton) of brimstone: Labor, 30.922; management, 1.162; supplies, 1.080; fuel, 1.841; exploration and preparatory work, 1.393; machinery for sinking, 0.445; interest of floating indebtedness, 1.534; taxes and other expenses, 3.093; freight from mines to the seaboard, 15.108; total, 56.578; average selling price, not including customs dues during the year, 77.619; profit, 21.041, divided as follows: To the mine owners, 11.151; to the leasers, 9.890.

R. TRAVAGLIA, Mining Inspector of Sicily.

CALTANISSETTA, Sicily, March 29, 1892.

Cost of Drying and Roasting at the Holden Mill, Aspen, Colo.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The writer designed a plant for drying and roasting ore which was put in operation in November, 1891, at the Holden mill, Aspen, Colo. It consists of four double shelf-driers, with one Taylor producer of 6 ft. diameter, and one large Stetefeldt furnace with a Taylor producer, also of 6 ft. diameter. This plant has a capacity of 100 to 120 tons of ore in 24 hours.

Mr. Morse, general manager of the Holden Smelting & Mining Company, gives the following information regarding the consumption of fuel: "On our last run of 4,631 tons of ore, we used an average of 96.4 pounds of coal per ton of ore, costing 14.45 cents."

"We are using a mixture of about equal proportions of Colorado New Castle and Sunshine coal, which costs us \$3 per ton delivered at the mill. The composition of the coal is as follows:

	Fixed carbon.	Volatile matter.	Ash.
New Castle.....	55.9%	35.9%	5.4%
Sunshine.....	43.0%	43.0%	7.5%

This is the cheapest drying and roasting on record in any silver mill, and speaks well for the apparatus used.

The introduction of the Taylor gas producer in silver mills is making rapid progress since I built the gas plant at the Marsac Mill, Park City, Utah, not quite two years ago.

"Outside of the Aspen mill, I have furnished plants for the Anaconda, Mont., where one matting furnace is now running with a Taylor producer. The large lixiviation plant to be erected at Lehi, Utah, will have three Taylor producers, and the Ontario mill will introduce gas this year. I am preparing the plans for this plant now. A. STETEFELDT, OAKLAND, Cal.

The British Patent Office.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Dr. Raymond's editorial in your issue of the 14th inst. entitled "Mr. Fell's Way of Getting Gold from Wheat" shows the lax methods of the British Patent Office. I have had a considerable amount of experience with the granting of patents in England, and it may therefore be of interest to you if I give you some account of the interior working of the office.

In the first place, there is absolutely no examination of patents in England, although there is a large staff of highly paid official "examiners," and any old and well-worn idea is good enough for a patent. A glance through the published specifications will reveal each week a dozen so-called "new or improved" processes which are perfectly familiar to a skilled engineer.

When an application for a patent is made, the specification is looked through by the "examiners," and if a somewhat similar one is found among the other applications waiting for a patent your specification is returned with a notice to that effect. They do not give you any idea of the contents of the other application, but only tell you that such exists. They add that it lies with you whether you consider it worth while to persist in the application. It is not their business to prevent infringements; you take a patent out at your own risk entirely. The only thing they are particular about is the *title* you select; this is a great source of trouble, and its mysteries I have never yet fathomed. The Fell patent is a well-known one among the patent attorneys in London, where it is generally thought to have been the outcome of a wager as to the degree of absurdity which will pass as sense at the office. Dr. Raymond says that the examiners have not dared to interfere with the punctuation. As a matter of fact they never do; they print a specification exactly as they receive it, orthographical and grammatical errors and everything intact.

An English patent affords very little protection. Supposing a distinctly new invention comes out, such as a corrugated furnace, a pneumatic tire, or a roll of sanitary paper, immediately there are floods of applications for patents from rival manufacturers. The inventions are just modified sufficiently to befog the lawyers who conduct the subsequent actions for infringement, and they are really all colorable imitations. Of course the patents are all granted, and the manufacturers immediately start to work turning out the infringing articles. If the holder of the prior patent has sufficient money he brings an action of infringement to restrain his rivals. Then commences a long and expensive litigation in which the leading scientific barristers and skilled witnesses appear. A skilled witness will swear to anything if he gets a large enough fee. My own opinion is that fully nine-tenths of the English patents would be overthrown if contested.

This irresponsibility of the Patent Office "Examiners" leads to another abuse. There are many professional "inventors" in England who apply for and obtain a patent for some impossibility, and then advertise in the daily press for money to work the invention. They usually promise 100,000 per cent. profit, and as a result all sorts of inexperienced people with limited means reply to his advertisement. He shows them the patent and they, knowing nothing about technical matters, but believing his statements, part with their cash. Of course they never see it again. If they bring an action against the "inventor" for obtaining money under false pretenses, he pleads that an invention is never brought to maturity in a hurry, and that it is only a question of time. The judge consequently acquits him. Now if there was only the most elementary sort of examination on the part of the officials, these swindles would be prevented.

NEW YORK, May 16th, 1892.

E. W.

The Elizabethton (Tenn) Co-operative Town Company.

EDITOR, ENGINEERING AND MINING JOURNAL.

SIR: I am in great doubt whether the labored article of President Porter, of the Co-operative Town Company, of Elizabethton, in your issue of May 21st, is worthy of a reply. A clearer piece of "special pleading" I have never seen.

In the words of another, "as to the justice of my criticism, and the value of Mr. Porter's reply, I shall allow your readers to judge."

The peculiar features of the scheme and management were brought to the notice of the stockholders in my former article, and if they are satisfied with Mr. Porter's explanation I am not, but the outcome is their funeral, not mine.

In any event, one object has been accomplished—the stockholders at last know what has become of a part of \$40,000 unaccounted for in the annual statement, but it has been hard work getting the information.

On April 23d ult., I wrote Mr. A. T. Britton, treasurer, a polite letter saying, that although none was presented at the annual meeting, I had no doubt but that he had prepared the usual financial statement showing specifically the receipts and disbursements, and as a stockholder, asked for a copy. To this letter I received no reply. On May 2d inst., I again wrote him, calling his attention to my letter of April 23d, and renewed my request. Under date of May 3d he wrote that he had answered my letter of 23d April (never received), and that "full statements of all receipts and disbursements of money were in the hands of the President, Mr. Porter, at the meeting of the stockholders." President Porter having such statements, carefully avoided giving them at the said meeting.

I have before me the April copy of the Watauga Valley News, the organ of the Town Company, with the President as one of the editors. It contains the report of the President and Board to the stockholders, and only the figures are given, as stated in my former article, and which showed \$36,010.86 as accounted for. It is unfortunate and indeed unexplainable, why President Porter in his article should not have presented a financial statement as prepared for the annual meeting, instead of bringing it up to May 2d, which necessarily runs it into a new fiscal year. This action seems to strengthen my former charge of either business incapacity or intent to conceal something.

But one thing is made plain to the stockholders, that even under the statement as of May 3d out of cash receipts of \$115,076.34, that \$25,342.

93, or over 20%, have been expended in management, and that of this amount, salaries have absorbed \$11,202.02 and general expenses (whatever this may cover) \$6,580.22.

There is scarcely a paragraph in President Porter's reply that a four horse team could not be driven through, but it is not worth the effort.

I still maintain that the Co-operative Town Company as constituted and managed is a gigantic scheme under a high sounding and taking name to get money from the many for the benefit of the few, and is unworthy of the support of right minded men. Apart from its specious promises, it is attempting to influence investors, by statements of ownership of valuable properties, which events have proved to be false. On the 5th page of its highly ornamental and rose colored prospectus, it is stated, "It owns mineral and timber lands described further along of great value." At the bottom of the same page the Co-operative Town Company has 5,200 acres of land for a city site, and tracts of adjacent iron manganese granite and timber lands."

On the 7th page after speaking of the great Cranberry mines, it says, "The Co-operative Company's lands include 800 acres of this famous lead of magnetite ore." At the bottom of the same page, "There are mountains of granite of every color and tint on the company's lands."

Judging from the style of President Porter's late article, it will be perfectly possible for him to reply that most of these statements were made by one P. Donan and not by him, but all of the above quotations are prominently set out as a part of the illustrated prospectus with Mr. R. P. Porter's name as president at the head, so he must assume the responsibility. The company doesn't own, and never did own any mineral lands. On the very day that this prospectus was being distributed to stockholders, Mr. D. Preston Parr, the general agent, told me that the company only held options on mineral lands, and within the last two weeks I have a letter from one of the large Tennessee stockholders, who had negotiated these options, stating that "to-day (the company) don't own a foot of mineral and granite lands." The whole intent of pages of the prospectus is to secure people's money on the strength of the great present and future value of mineral lands which are neither owned nor controlled by the company. Further comment is unnecessary.

The most astonishing part of President Porter's article is his labored and impotent attempt to prove that the eleven directors only received \$52,800, and not \$528,000, for their two years' services on the board. Extracts would not do justice, so I give his own words: "The directors' stock is in no sense a part of the purchase price of the lands bought, nor is it in any sense 'promoters' profit,' but it is all the compensation which the directors will receive for valuable services performed for a period of two years. The subscribers to stock in series A pay \$10 per share, not \$100. Generally it may be said they pay this in money. In the case of the directors they pay it in services, and the total sum instead of being \$528,000 is \$52,800. There has been no attempt to conceal from subscribers or others the compensation to be paid the directors. On the contrary, the by-laws, which are shown to all subscribers, provide expressly and clearly what this compensation is to be. The board of directors has held numerous meetings during the last year, several members of the board traveling long distances to attend these meetings and paying their own expenses. The directors and officers have also purchased largely of the company's stock, and they are paying considerable sums of money into the treasury every month."

Even on the basis of \$52,800 as compensation the stockholders will be gratified to learn that several of the directors paid their own traveling expenses. Did the cost of the special Pullman car that took them all to the annual meeting come out of this, or is it included in "General Expenses?"

No matter what President Porter may say, the fact remains that \$528,000 of fully paid stock has been given to the 11 directors, and whether Series A has paid in the whole or part of \$10 a share, or Series B, \$25 a share, that unless this directors' stock is declared invalid, as full paid it carries with it an ownership in the property of \$528,000, or a good deal more than the whole original cost of the entire property, and more than can be collected from all the allowable calls on Series A and B.

The work of getting more money from the credulous and confiding public is being vigorously and industriously pushed within the last few weeks. The stockholders have been flooded with warnings from headquarters that there are only a few shares of Series B left, and that if they don't get in they will have nothing left but Series C, on which \$40 per share is to be called, and the new series will not participate in any dividends that may be declared in the near future, and that the shareholders' syndicate that bought lots at Elizabethton will be closed at an early day, and that quick application must be made. The foot of Bulletin No. 5, of May 19th, reads:

"Don't forget Series B closes May 31st.

"The stockholders' syndicate on Elk avenue closes same date.

"The same old "slogan" that from time immemorial has been used to entrap the unwary and credulous who want to make their pile in a hurry. And as a fitting adjunct to these beautifully printed and vividly worded bulletins, President Porter in his article naively remarks, that it is "lack of familiarity" with the co-operative plan that causes scepticism, "as able accountants and actuaries have already shown" the condition of the company "is such that a dividend even now on Series A and B would be certainly justified."

Capital! each dividend, even if it be "cats and dogs," puts just so much more on the 5,280 shares of directors' stock. The whole thing savors strongly of the Tallapoosa and the various financial co-operative schemes that have lately come to grief all along the line, leaving their victims much richer in experience, but poorer in cash.

But there is no use in wasting any more time on this project.

What President Porter and his associates may say or do, what newspaper articles they may write, what bulletins they may circulate, and what gulls they may catch, won't interest me. As before stated, what I have written has been from a sense of professional duty. It remains for the stockholders, if they care to do so, to prove the truthfulness or falsity of the statements I have made.

In any event, they are perfectly welcome to the modest amount I have invested, which I hereby place at the disposal of President Porter's "accountants and actuaries," and on which they ought to be able to calculate a "dividend even now" on Series A and B. Series C will have to wait.

EDMUND C. PECHIN,

ROANOKE, May 29, 1892.

JUDGE HEBBARD AND THE ATTORNEYS FOR THE PLAINTIFFS IN THE HALE & NORCROSS SUIT.

Judge J. C. B. Hebbard, before whom the celebrated case of Fox vs. The Hale & Norcross Silver Mining Company was tried, was born in Canada in the year 1854, and came to the United States with his parents in the year 1862. The foundation of his education was laid in the public schools of San Francisco, and from there he went to the St. Augustine College, at Benecia, where he graduated in 1872. He was teacher and military instructor at St. Mathew's Hall, at San Mateo, San Mateo County, Cal., from 1872 to 1879. During this time he applied himself to the study of law, and in the year 1879 was admitted to practice. In 1879 to 1888 he practiced law in San Francisco. In 1888 he was

December, 1851. He was admitted to practice law before the Supreme Court of Tennessee in 1872; came to San Francisco in 1877; was founder of the *Law Journal*, which he conducted successfully for a number of years; was editor of the *Examiner* and built it up from a circulation of about 2,000 to between 19,000 and 20,000; was reporter of Supreme Court decisions for a number of years.

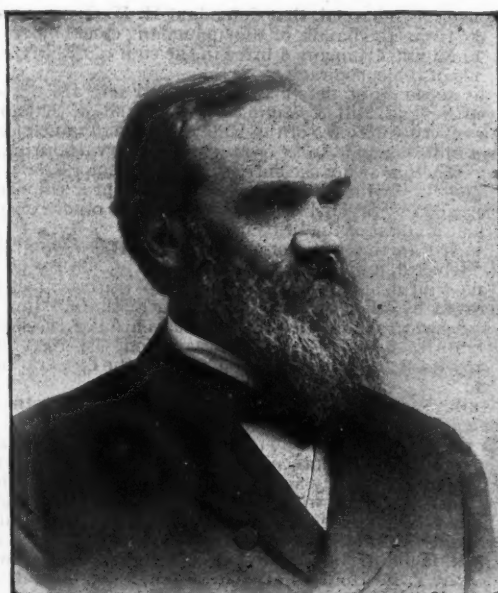
Mr. Baggett has been connected with some of the most important and heaviest litigation which has occurred on the Pacific Coast. His father, Judge W. P. Baggett, is still living at Brookhaven, Miss.

LEWIS D. MCKISICK.

Lewis D. McKisick has a long American lineage. His grandfather, Daniel McKisick, served as captain in the Revolutionary War. Dr.

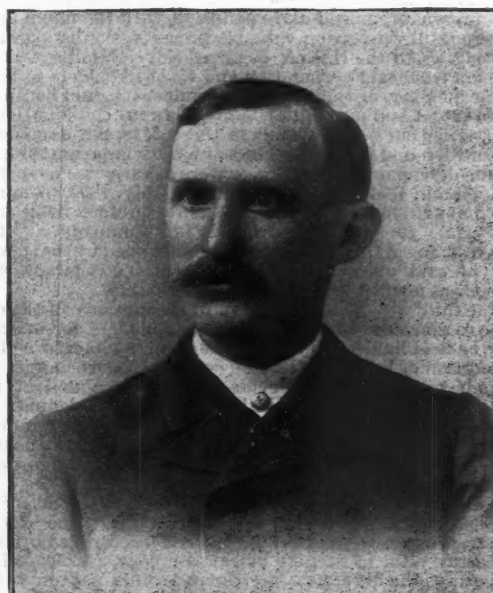


JUDGE J. C. B. HEBBARD.



L. D. MCKISICK.

THE JUDGE AND COUNSEL WHO GAINED THE GREAT VICTORY OVER THE COMSTOCK MILL RING.



W. T. BAGGETT.

elected justice of the peace and occupied that position for two years. At the expiration of that time he was elected Superior Judge of the City and County of San Francisco, which position he occupies at the present time.

The Hale & Norcross case was long and tedious, and at times there was much bitterness shown by the counsel engaged in it. Judge Hebbard through all maintained a patience and equanimity which betokened a high degree of self control.

His rulings, clear, prompt and pointed, excited admiration from those who heard them, and at the close the counsel for both sides thanked him for his urbanity throughout the trial of the case.

WM. T. BAGGETT.

Wm. T. Baggett was born in Copiah County, Miss., on the 16th day of

Wm. H. McKisick, his father, settled in Henderson County, Tennessee, where Lewis D. McKisick was born March 7th, 1829.

Was admitted to practice before Supreme Court of the State of Tennessee in 1854, and commenced practice in Memphis, where he soon attained an enviable position at the bar.

Was appointed a member of the Court of Arbitration in Tennessee in 1875, in which position he served for two years.

He came to California in 1879 and located at San Jose. Judge McKisick, until his removal to California, easily held first place at the Tennessee bar, and his removal caused many regrets and brought forth the highest encomiums from his confreres.

After remaining a few years in San Jose, he removed to San Francisco

and accepted an invitation to become one of the regular counsel of the S. P. R. R. Co. During his connection with them he was engaged in several causes of the largest magnitude in the interests involved.

Judge McKisick is no longer connected with the railroad company, but is now engaged in private practice.

(For these particulars we are under obligations to Oscar T. Shuck, author of "Bench and Bar in California.")

M. W. FOX vs. THE HALE & NORCROSS SILVER MINING COMPANY et al.

Decision of Judge Hebbard in Favor of the Plaintiff.

This famous and important suit, as already mentioned in our columns, was decided in the Superior Court in San Francisco on the 26th ult.

This case occupied forty-two days of actual trial, of which thirty-eight hours were devoted to oral argument. The volume of the record, as shown by the official reporter's manuscript, is 2,859 pages. The case was finally submitted for decision upon the third day of May, 1892, since which time the Court has carefully read and considered all the evidence and the printed argument of counsel presented in lieu of the customary briefs.

The three important questions considered by the Court were: Did the stockholders of the mine suffer any loss in profits during the period covered by the complaint? If so, are the defendants or any of them liable for the loss? If the defendants are liable, what is the measure of the entire loss, and what is the measure of each defendant's liability.

The Court said: "The evidence answers the first question with absolute certainty in the affirmative. Nearly every witness in the case, whether called by the plaintiff or defendants, either on direct or cross-examination, contributed some facts or some circumstances tending to show this result, and the ultimate fact in this respect is that out of a mass of 88,887 tons of ore dug out of the Hale & Norcross mine during the years 1887, 1888, 1889 and up to July 1, 1890, showing a valuation by car sample of \$3,505,361, and crushed at the Vivian, Mexican and Nevada (or Chollar) mills, not one cent was ever received by the stockholders in the shape of profits. There was one dividend of \$112,000 declared during that time, but there was also two assessments of \$112,000 each levied during the same time, making \$224,000 of assessments as against \$112,000 of dividends, and therefore a net loss to the stockholders during those three years and a half of \$112,000 instead of any profit whatever; and this fact stands out in evidence against the positive instructions, as shown by the testimony of the employés of the mine, that no ore of car sample value less than \$12 or \$14 per ton should be sent to the mill."

"The second question to be answered is of vital importance, for upon the answer depends the whole of this case.

"Are the defendants, or any of them, liable for the loss suffered by the stockholders of the Hale & Norcross Silver Mining Company.

"The Court is of the opinion that the evidence is sufficient to constitute an affirmative answer to the second question involved in the case, and the Court therefore finds that during all of the times, from about March 1, 1887, until July 1, 1890, of the period covered by the complaint herein, an unlawful combination and conspiracy existed, which unlawful combination and conspiracy was organized and conducted with the intent and for the purpose of wrongfully diverting valuable property, consisting of ores and bullion belonging to the Hale & Norcross Silver Mining Company and its stockholders from said corporation and its stockholders to the use and benefit of the members of said unlawful combination and conspiracy.

"That the said intent and purpose of said unlawful combination and conspiracy was carried out by the members thereof, to the damage and loss to said corporation and its stockholders of a very large amount.

"That all of the defendants herein are, or were at various times between the first day of March, 1887, and the first day of July, 1890, members of said unlawful combination and conspiracy, and therefore liable to said corporation, the Hale & Norcross Silver Mining Company, and to the stockholders thereof, for all losses and damages sustained by that corporation by reason of said unlawful combination and conspiracy, but in various proportions as against the individual defendants.

"To answer the third question is to ascertain the measure of the entire loss and damage to said corporation and its stockholders for which the defendants may be held liable, and also to determine the measure of each defendant's proportion of liability. In doing this the Court might order an accounting to be taken; but as the evidence discloses abundant material for calculation and figures sufficiently exact to base a definite judgment upon, I deem it proper to proceed at this time to determine the amount of judgment to be rendered in the case. The evidence as to the amount of damages is exceedingly voluminous; there are figures upon nearly every page of the testimony, and calculations have been made upon every conceivable hypothesis and from every standpoint of fact. During the period mentioned in the complaint, 88,887 tons of ore of the Hale & Norcross mines were milled at the mills controlled by the defendants. The assay value of that ore by car sample was \$3,505,361.

"The evidence as to the difference in estimated value per ton between assays taken by car sample and pulp assays is that in high-grade ores the difference will be about \$10, and in low grade ores much less; but the descending percentage is not definitely fixed. Some of the defendant's employés testified that ore worth \$15 per ton by car sample assay ought to show \$12 or \$12.50 per ton by pulp assay, but taking the two extremes of difference and allowing a reasonable limit for honest loss in settler, moisture, slimes, concentrates and other residues, \$10 is a fair average of difference to allow per ton from the value as shown by car sample, whatever that value may be, and the remainder, which ought to have been returned in bullion. I find that the evidence justifies the employment of these figures as a basis of determining the total amount of damage for which judgment must be given. The defendants are entitled to no profits for milling these ores. Under the finding that the ores were fraudulently milled, they were entitled to no more than actual cost under the law relating to fraud and the measure of damage. The amount of bullion returned was \$1,826,873, out of which was

taken \$622,209 for milling charges at \$7 per ton, leaving a net return of bullion from the mills to the mining company of \$1,204,664. Of the amount charged for milling, allowing the highest estimate in evidence of actual cost at \$4.50 a ton, the actual cost of milling these 88,887 tons would be \$399,992, leaving a profit at \$2.50 a ton of \$222,217. Employing these figures in the calculation of a result, under the findings and conclusions already stated, the calculation is as follows: Value of 88,887 tons by car sample, \$3,505,361; deduct \$10 per ton for difference between car sample assay value and value in bullion, \$888,870, amount which ought to have been returned in bullion, \$2,616,491; amount of bullion actually returned, \$1,826,873; deficit, \$789,618. Add profits of milling 88,887 tons at \$2.50, \$222,217; amount of damage, \$1,011,835. I therefore find the total amount of damages caused to the Hale & Norcross Silver Mining Company and its stockholders by reason of the said unlawful combination conspiracy of defendants herein to be the sum of \$1,011,835.

"I find that the defendants, Alvinza Hayward, W. S. Hobart, the Nevada Mill and Mining Company and H. M. Levy were members of the conspiracy during all of the times covered by the complaint, and that they are and each of them is liable in the full amount of \$1,011,835.

"Of the other defendants who were directors of the Hale & Norcross corporation at different times during these years I fix the amount of each case in proportion to the period during which he was a director by the number of tons of ore milled during that period, multiplied by the profit of \$2.50 per ton, and find each one to be liable in the following amounts, respectively: C. T. Bridge, \$12,045; W. B. Sell, 12,046; J. W. Souther, \$12,045; W. C. Watson, \$115,775; Charles P. Egan, \$210,172.50; A. K. P. Harmon, \$210,172.50; Joseph Marks, \$210,172.50; Charles S. Wheeler, \$210,172.50; E. B. Holmes, \$69,905; J. B. Low, \$36,457.50."

The judgment was as follows:

"But for the time required for other cases, I should have attempted to reconcile counsel's conflicting interpretation of the law to the facts of this case. Suffice it to say, however, that a conspiracy and consequent damages such as alleged in this case being proven, there has been, in my opinion, no single section of statute law and no single decision of a court of appellate jurisdiction cited that would warrant this court in finding any other judgment than the one now about to be rendered in this case.

"It is therefore ordered that the said corporation, the Hale & Norcross Silver Mining Company, do have and recover for the benefit of all its stockholders from the defendants herein—to wit, the respective amounts from each defendant as above specified, and that plaintiff have judgment for his own costs herein against all the defendants, and it is further ordered that a receiver be appointed to collect the judgment herein for the use and benefit of said corporation and its stockholders, with present bonds fixed in the sum of \$50,000, which said bonds may be increased as may be found necessary, and that J. J. Groom, clerk of this department, be appointed such receiver.

"Let proper findings and decree be prepared in accordance with this opinion."

The attorneys for Fox were W. T. Baggett and ex-Judge McKisick. The counsel for the defendants were ex-Judge Mesick, W. S. Wood, Byron Waters, H. G. Sieberst, Garber, Boalt and Bishop.

Judge Hebbard said of H. M. Levy, who was director and president of the corporation:

"He did not take the witness stand, nor make deposition, but it is proven beyond dispute, by the evidence, as one of the acts of combination and conspiracy charged, that defendant H. M. Levy agreed to take and did take from the hands of the defendant stockholders in the Nevada Mill and Mining Company a bribe in the sum of \$29,641.20 as his share of the spoils of the conspiracy.

"The accounts of defendants Hayward and Hobart with the defendant, the Nevada Mill & Mining Company, show that one-eighth of the profits of crushing ores of the Hale & Norcross mine at the Mexican and Nevada mills was paid to Levy at stated intervals during the years mentioned. Whether or not the entries in those accounts show the true amount of profits out of which Levy's one-eighth was proportioned is as uncertain as whether Levy divided this one-eighth with other conspirators or kept the whole amount of the bribe himself."

In regard to the testimony of Alvinza Hayward and W. S. Hobart, Judge Hebbard, among other things, says:

"This willful and persistent failure to testify directly to facts which are proven by other evidence in the case or the startling failure of memory in regard to such material facts, casts around these stockholders and defendants and the defendant corporation, the Nevada Mill & Mining Company itself, a mantle of suspicion that the corporation was conceived in fraud."

The allegation of fraudulent milling is sustained by the evidence.

The court also says:

"In addition to the proofs in support of the foregoing allegations there are some other circumstances in evidence which weave the web of conspiracy more completely around the defendants and challenge from them the refutation of guilt, which challenge they did not accept upon the trial.

"Evan Williams, the superintendent of the Nevada mill, is also a stockholder and vice-president of the Bullion and Exchange Bank at Carson. Mr. T. R. Hofer is cashier and Messrs. Peters and Brown, clerks of the bank. Mr. T. R. Hofer is also chief clerk and sometimes acting superintendent of the United States Mint at Carson. Mr. W. S. James, an assayer at Gold Hill, is a brother-in-law of Evan Williams.

"A large amount of bullion was conveyed by Williams to Assayer James Gold Hill. A large amount of bullion was traced from James to the Bullion and Exchange Bank. A large amount of unstamped bars of bullion were deposited in the United States Mint at Carson at or about the same time that certain deposits of Hale & Norcross bullion were made there. A large amount of bullion was deposited in the United States Mint at Carson in the names of Hofer, Peters and Brown, of the Bullion and Exchange Bank. So far as the evidence is concerned, all of this bullion remains unaccounted for. Hofer, Peters, Brown and Williams refused to answer any questions concerning the identity of this bullion, and access to the books of the Bullion and Exchange Bank was denied to plaintiff.

"In cases of fraud, the law allows plaintiff to indulge in all reasonable presumptions in view of the fact that the defendants had the means of

clearing up these suspicious bullion transactions. If, by the presentation of the books of the Bullion and Exchange Bank, they could have done so, and did not chose to do so, it is a reasonable presumption that this bullion thus circumstantially traced into the hands of the conspirators or their agents, was the identical bullion lost to the Hale & Norcross Mining Company."

Referring to the Nevada mill the court says:

"The cost of its mill is uncertain, though Messrs. Hayward and Hobart and Williams testify that they think it cost \$300,000. Who paid for it or in what proportion was the cost to each individual stockholder will probably always remain in the gloom of decayed memory, or as counsel puts it, 'in nubibus,' for these witnesses disclaim any recollection of the individual cost, or of the financial origin of the corporation and its mill, except that, in a general way, they believe it grew out of some mining stock transactions between them.

"They also disclaim all knowledge of the receipts, disbursements or profits of the corporation, except that Mr. Hayward has some \$80,000 and Mr. Hobart some \$90,000 of its moneys on deposit, and declare that no dividends have ever been paid nor any earnings or profits distributed since the organization of the corporation in 1886, and they do not know that any will ever be distributed."

"Thus far it appears that Hayward and Hobart, acting for the Nevada Mill and Mining Company, selected and elected the directors of the Hale & Norcross Silver Mining Company, and by the payment of money secured undue and unlawful control of the mining corporation.

"Thus far it appears that the said directors acted in subserviency to the mill owners and stockholders and in direct violation of their trust and with willful intent or criminal negligence for three years and a half, permitted a few shrewd persons to gather in the profits of the corporation which ought to have been distributed pro rata among its confiding stockholders at large."

The Hale & Norcross Silver Mining Company has a capital stock of \$11,300,000 and is divided into 112,000 shares of \$100 each.

THE ALLEGED NEW METAL VESBIUM.

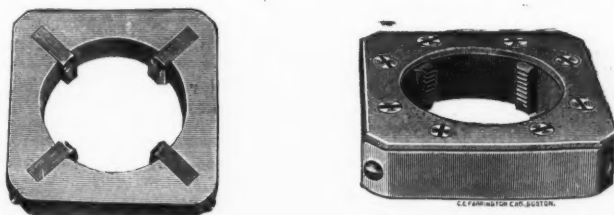
With regard to the alleged discovery of a new metal, "vesbium" in the Vesuvian lava, by Prof. Scacchi, Dr. T. L. Phipson writes the following in *Iron*:

"I formerly discovered notable quantities of selenium in the arseniferous sulphur of Puzzuoli, near Naples in 1862. I have lately examined the lava and yellow crusts of the fumarole from the crater of Vesuvius (specimens taken in 1879), and have found, besides the substances usually met with in volcanic products, considerable quantities of fluorine, which appears to have escaped the notice of Sylvestri, and minute quantities of molybdenum, which has, perhaps, given rise to the belief that a new metal, vesbium, exists in the yellow and green crusts of some ancient lava of Vesuvius, as described by the veteran observer, A. Scacchi.

After carefully reading the paper of Professor Scacchi I am almost convinced that he was dealing with molybdenum and copper (and probably minute quantities of other substances) in the green and yellow crusts which he examined on the ancient Vesuvian lava. Nevertheless, further research is requisite. The manner in which I detected molybdenum in the yellow crusts from the fumarole found in the crater of Vesuvius in the spring of 1879 is as follows: The finely pulverized lava and its incrustation is treated with hot aqua-regia; the solution, slightly evaporated and without filtering, is neutralized by ammonia in slight excess; yellow sulphide of ammonium is added, and the mixture allowed to remain for some hours in a closed vessel. It is then rapidly filtered, and the filtrate neutralized with hydrochloric acid in slight excess. The flask is closed immediately with a cork, and allowed to remain thus for two days. At the end of that time the brown sulphide of molybdenum will be found upon the precipitated sulphur. (The sulphide of molybdenum requires a long time to precipitate in an acid liquid, and more so when its quantity is small.) The precipitate is collected on a platinum dish and roasted, to drive off the sulphur and convert the sulphide into molybdic acid. Copper and lead are invariably present in small quantities in the incrustated cellular lava. The yellow crust also yields ammonia, and there are indications of many other substances to which I may refer later. I find that the lava after being treated with a boiling solution of caustic soda, gelatinizes with hydrochloric acid, and this character may, perhaps, enable us to distinguish between the lava of modern and of ancient volcanoes."

HAYES ADJUSTABLE PIPE DIE.

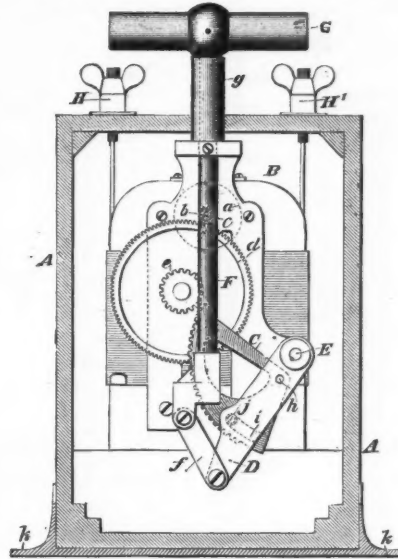
This tool is a new form of adjustable pipe die manufactured by the Hayes Tool Company, of Portland, Me. The die is constructed with four cutters which are held in the die block by the face plate, as shown. The cutter when backed against the block will cut to United States standard. Loss in wear is compensated by means of set screws which engage with



each cutter at the corners of the die. By removing the face plate the worn cutters can at any time be taken out and new cutters substituted, or the old cutters after resharpening. The die is made 4 in. square, and will fit any die stock of this dimension. The cutters are made of the best tool steel and owing to the dies being removable the tool is practically indestructible.

MAGNETO ELECTRIC MACHINE.

The invention which is shown in the accompanying engraving is that of James Macbeth, of Brooklyn, N. Y. The machine is novel in its construction, especially that part of the mechanism which actuates the armature. The handle when pulled upward moves the arm D, this arm imparts its motion to the geared segment C, which in turn engages with the small pinion e, transferring the motion to the armature shaft b. When the handle has reached its full height the segment C, with E as a center has performed its duty as a segment of a circle with E as a center; at



this point the center of the segment takes the pin h, as a center, and is eccentric to its former position. The teeth then disengage from the pinion e. The handle when released allows the segment to return to the position shown in the illustration. The machine is arranged with foot rests k, k, to hold the machine down when the handle is pulled upward. H, H, are the points of contact. It is claimed that the machine is not likely to be overthrown and is more efficient in its work than either the crank or lever machines and more reliable than the ratchet movement machines. It is particularly useful in blasting operations.

IMPROVED ROD CUTTER.

H. L. Judd & Co., of New York, are introducing a new form of rod cutter. The accompanying illustration shows the stationary plate of the cutter with the holes for introducing the rod to be cut. The cutting plate



is firmly attached to the stationary plate and is operated by means of the lever, on the end of which teeth are arranged, engaging with teeth in the upper end of the cutting plate. The inventors claim that the advantages gained are cleanness in cutting, perfect adjustment as to length. The gauge is shown in the illustration. The machine will cut rods up to and inclusive of 3/4 in.

Tests of Solidified Petroleum.—Some trials with solidified petroleum were made a few weeks ago at the works of the Solidified Petroleum Corporation at Hackney Wick, London, and they demonstrated that a 6-horse-power tubular boiler containing eighty gallons of water could be heated by 62 lbs. of the Chenhall fuel (or solidified oil), and in 36 1/2 minutes steam raised to indicate 60 lbs. to the inch, while it took 106 lbs. of coal and wood to raise steam to 60 lbs. in one hour's time.

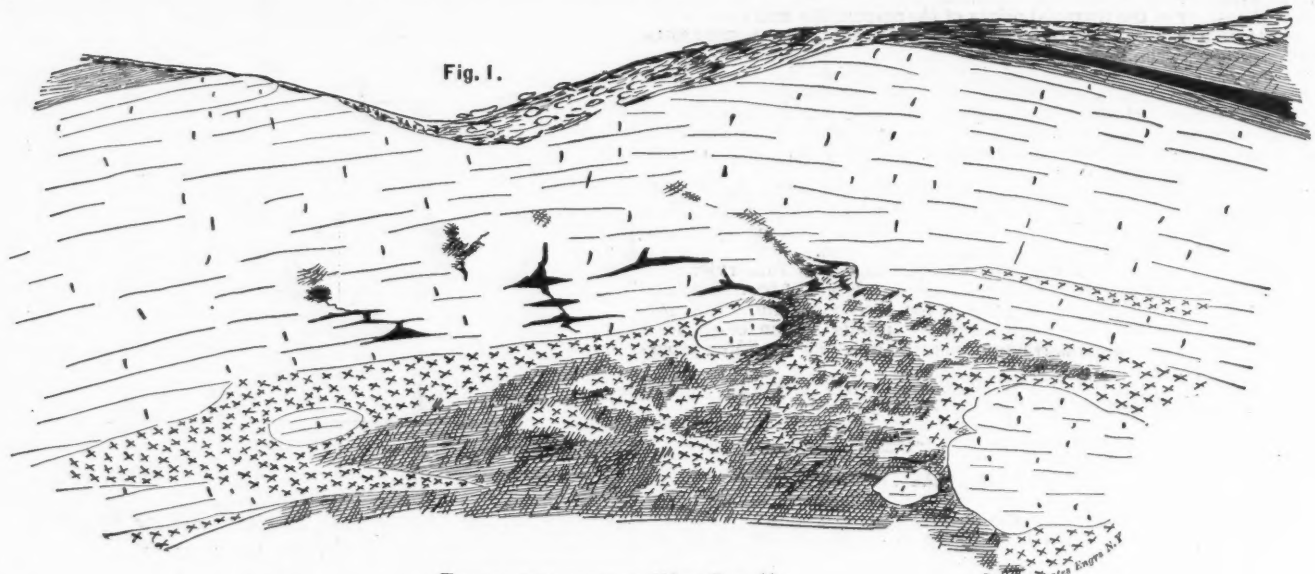
Test Loads for Bridges.—The *Centralblatt der Bauverwaltung* does not believe in the value of load tests for bridges. It considers that far too much importance is attached to it, and that, accordingly, erroneous deductions as to the safety of bridges tested by applying loads and noting the resulting deflections are abundant. The case is cited of an iron bridge in which a recent careful inspection revealed alarming local corrosion. Still, a test load, applied only a few days before, had produced a deflection well within permissible limits, and the railway company owning the bridge was therefore satisfied as to its safe condition.

ZINC-BLENDE MINING NEAR WEBB CITY, MO.*

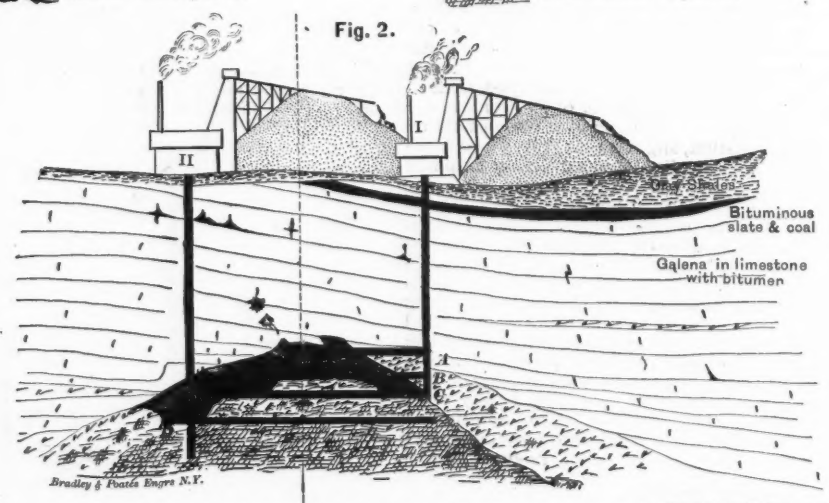
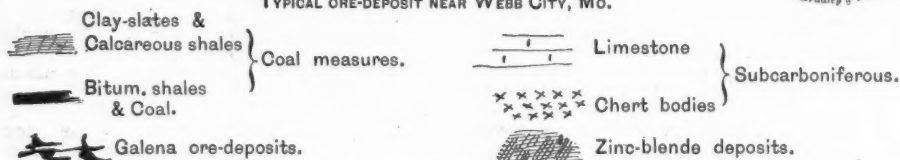
By Carl Heinrich.

The object of this paper is to point out the wastefulness of the present method employed in mining the zinc-blende deposits found near Joplin and Webb City in Southwest Missouri, and to suggest a more correct and ultimately more economical manner of conducting operations. In this district the zinc-blende occurs in lenticular deposits in the upper strata of the sub-carboniferous limestone. Between the ore and the limestone there

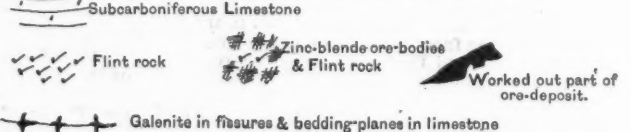
tion and plan a typical case of this sort. Lots I. and II. are on the land of a mining company who, at the time the lots were let, had sunk a neighboring pump shaft outside of both lots and drained the ground to the level B. The workers of I. and II. sunk shafts and worked out to the level B, over the area b (Fig. 3). The roof being unsupported (see Fig. 6) is in danger of falling in, and this event will be only a question of time. This has occurred in a great many cases, and as the companies are in no hurry about draining to a greater depth, most of the roofs will have collapsed before the excavations have got any deeper. At first the miners left supporting pillars of ore, but they got tired of waiting for



TYPICAL ORE-DEPOSIT NEAR WEBB CITY, Mo.



TYPICAL ZINC-BLENDE ORE-BODY NEAR WEBB CITY, Mo. VERTICAL SECTION.



is always a deposit of chert or flint, which also assumes a lenticular shape. A typical deposit is shown in Fig. 1. Most of the deposits are near the surface of the ground, and the working of them is therefore a comparatively easy matter.

The usual way of conducting mining operations at Webb City is for the owner of the soil to lease it to a mining company, who sink trial shafts and prospect generally. When an ore deposit is struck the shaft is sunk only a short distance down, not by any means to the bottom of the deposit. The upper part of the vein is thus drained and a sufficiency of water is obtained for the concentrating processes. The surface is then let out to individual miners in lots usually 200 ft. square. These miners sink shafts and work out the part drained; and as no supports are used, the limestone roof generally caves in and the lower part of the ore deposits are buried and lost. This method will readily be seen to be wasteful, although the first cost of mining is so small as to allow a poor man to make a start. Figs. 2 and 3 show in vertical sec-

the renewal of the pumping operations and so removed the pillars one by one.

The rational way of mining these lenticular deposits is illustrated in section in Fig. 4. When a trial shaft strikes a deposit it should be continued down to a fair distance below the bottom, so that it shall drain the whole of the deposit. The approximate extent and shape of the ore body should then be ascertained by means of drifts from the discovery shaft at various levels. A second and smaller shaft for ventilating purposes should then be sunk at or near the center of the deposit. The mining should begin at the bottom of the deposit and extend upward in an arch form, as in Figs. 4 and 5, so that the roof shall always be able to support itself. The timbering for gaining access to the faces is shown in Fig. 4. The barren pieces of rock need never be raised out of the working, and the tailings from the concentration processes may be lowered down the air shaft to fill up the vacant space at the bottom of the working underneath the timbering. By this means, after the whole ore body has been excavated, the space formerly occupied by it will be partly filled up again, so that the roof will be more or less supported. Another advantage

* Abstract of a paper read at the Baltimore meeting of the American Institute of Mining Engineers, February, 1892.

will be that the unsightly mounds usually seen round the shaft mouth will be done away with; neither will their weight bear down on the limestone roof.

It seems a pity that the common sense method is not adopted in Webb City. Unfortunately, in this district they say that the other method was the one used before, and that it will be used again.

U. S. SUPREME COURT MINING DECISION (OCTOBER TERM, 1891).

Benson Mining & Smelting Company, Applt. Alta v. Mining & Smelting Company, Appellee.

EFFECT OF FAILURE TO PERFORM STATUTORY YEARLY WORK AFTER MINE PAID FOR BEFORE ISSUING OF PATENT DUE AND APPLIED FOR.— VALIDITY OF RELOCATION BY ADVERSE PARTY—SEC. 2324, R. S. U. S., CONSTRUED.—VESTED RIGHTS.

1. The uniform ruling of the General Land Office (U. S.) has been against the appellant's contention, that although a mine may be fully paid for by the locator (in 1879) and a certificate of purchase received, inasmuch as a patent therefor did not issue till years after (in 1884) and though location work (\$100 per annum) having been fully done, except in 1882 that appellee's rights ceased, and relocation by another was valid, and tested in him the property.

2. When the price of a mining claim has been paid, the equitable rights of the purchaser are complete and there is no obligation on his part to do further annual work; the delay in issuing the patent being a mere inci-

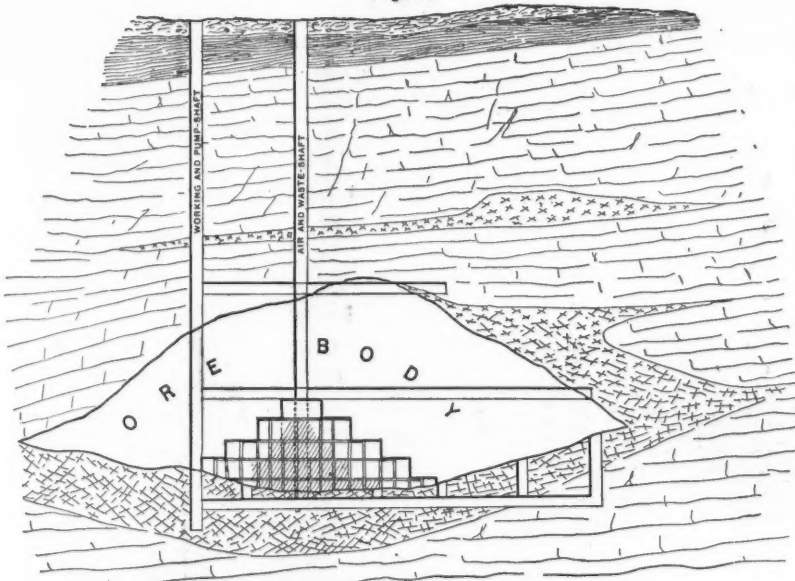
6. It is a general rule in respect to the sales of real estate, that when a purchaser has paid the full price his equitable rights are complete, and there is nothing left in the vendor but the naked legal title which he holds in trust for the purchaser; and this general rule has been repeatedly applied by this Court to the administration of the affairs of the Land Department of this government, and the ruling has been uniform that whenever in cash sales the price has been paid, or, in other cases, all the conditions of entry performed, the full equitable title has passed, and only the naked title remains in the government in trust for the other party, in whom are vested all the rights and obligations of ownership.

7. There is no conflict in the rulings of this Court upon the question. With one voice they affirm that when the right to a patent exists, the full equitable title has passed to the purchaser with all the benefits, immunities and burdens of ownership, and that no third party can acquire from the government interests as against him.—BREWER, opinion. Judgment of court below affirmed. *Error from the Supreme Court of Arizona Terr.* [Decision May 16, 1892.]

EXPLOSIONS IN COAL MINES.

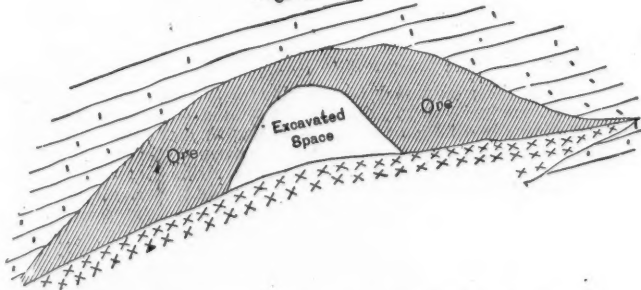
The question as to whether coal dust itself is explosive has been investigated by Professor Clowes, of England. Many cases have been recorded where inflammable dusts suspended in air have been accidentally fired in confined spaces, and have led to more or less destructive explosions, frequently followed by disastrous fires. Finely powdered coal dust, how-

Fig. 4.



Ideal Section, Illustrating correct manner of mining.

Fig. 5.



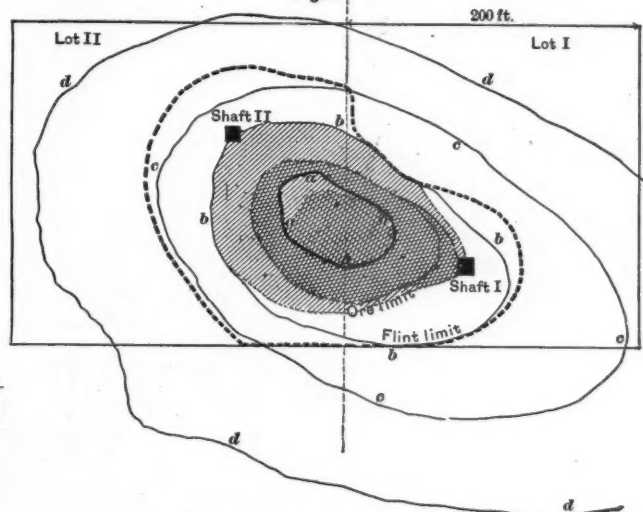
dental matter occurring in the administration of the Land Department, and the patent when issued by relation taking effect as of the date of the purchase—*Re American Quartz Hill Mine* (Copp's U. S. Mining Laws, p. 254—Sickel's do, and Decisions, pp. 377—385), cited.

3. The Mining Laws United States create three distinct claims of titles, viz.: 1st. Fee Simple. 2d. Possession, and 3d. Complete Equitable Title. The first vests in the grantee of the government an indefeasible title, while the second is in the nature of an easement only. The first being an absolute grant by purchase and patent without condition, is not defeasible, while the second being a mere right of possession and enjoyment of profits without purchase and upon condition, may be defeated at any time by the failure of the party in possession to comply with the condition, viz.: to perform the labor or make the annual improvements required by the statute. Third.—The equitable title accrues immediately upon purchase, for the entry entitles the purchaser to a patent, and the right to a patent once vested is equivalent to a patent issued.

4. Obviously, section 2324 does not provide for the acquisition of title to the land.

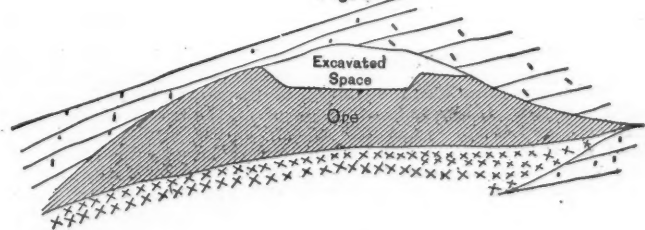
5. When the price therefor is paid, the right to a patent immediately arises, and if not issued at once it is because the magnitude of the business of the Land Department causes delay. Such delay in the mere administration of affairs does not diminish the rights flowing from the purchase, or cast any additional burdens on the purchaser, or expose him to the assaults of third parties.

Fig. 3.



PLAN OF ORE-DEPOSIT SHOWN IN FIG. 2. Limits of ore or flint-body; a a a, at level A, Fig. 2; b b b, at B; c c c, at C; d d d, at D. The dotted line incloses the area within which there is no adequate support of the roof of the ore-deposit.

Fig. 6.



ever, refuses to kindle when floating in pure air. When, however, this dust is disseminated through air which contains a small proportion of coal gas, the mixture is readily fired by means of a flame. This is found to be the case even when the same mixture of gas and air, without the coal dust, cannot be fired by a flame. Such an explosion of air containing a small percentage of gas, and charged with fine coal dust, is capable of raising coal dust into the air and kindle it over a very considerable area. A gas explosion in a mine may thus be vastly extended in area by the presence of coal dust in the atmosphere, or even on the floor or timbers. It is certain, however, that the power possessed by coal dust of different kinds to thus propagate an explosion varies widely. Very fine, dry, non-adhesive dusts seem to possess the power to the greatest extent.

It is probably now generally connected that the principal dangers arising from coal dust in the mine are the following: (1) The danger arising from a very small proportion of fire damp, which in itself would be harmless, becoming explosive when kindled in the presence of coal dust. (2) The danger of a small local explosion, which of itself would be of little moment, becoming vastly extended by raising fine coal dust into the air, and kindling it. (3) The serious results of such an explosion, in which coal dust has taken part, are the burning of surfaces by the glowing dust, and the very fatal nature of the after-damp; the after-damp probably owes its fatal character to the more complete removal of oxygen owing to the increased combustion, and to the production of extremely poisonous carbonic oxide.

THE BENNETT AUTOMATIC ENGINE.

The Morris County Machine and Iron Company, of Dover, N. J., has selected an approved form of slide valve operated by a fixed eccentric on the crank shaft, and the revolving ball governor operating a cut-off valve for their new Bennett engine. With its indicator cords are produced fully equal to those from a Corliss engine. Our combination consists, first, of a main slide valve controlling the steam lead and exhaust. This is operated by means of a fixed eccentric on the shaft. The cut-off valve, which is merely a flat plate resting on the back of the main valve, is also operated by means of a fixed eccentric on the main shaft (set about 45 degrees in advance of the main eccentric). This cut-off valve is made to travel back and forth across ports in and near the ends of the main valve. It is a "riding" cut-off, not a "Meyer" valve exactly, but similar to it in operation. The admirable features of this style are familiar and well recognized. But the Meyer cut-off is limited to hand regulation by means of screws and a hand wheel. It is not automatic, the travel of this valve is constant. This cut-off valve is adjusted to the requirements of load and speed by means of the simple ball governor before referred to.

The operation of these improvements may be best understood by referring to the engraving representing the back view of the engine. It will be seen that the eccentric rod of the cut off is divided by a slotted arm; that the arm is pivoted at its lower end; that the eccentric portion of the rod is attached to the upper end of the arm, and that the other part of the rod is attached to the valve stem and to a block which fits the slot of the arm and which is free to slide up and down therein. This end of the rod is also attached to the pivoted lever of the governor by means of a small jointed rod, as shown.

When the engine is running the slotted arm moves back and forth on its pivot and with the throw of the eccentric. The governor revolves at a moderate speed and proportionate to the speed of the engine. The centrifugal force of the revolving balls is the governing medium. If the

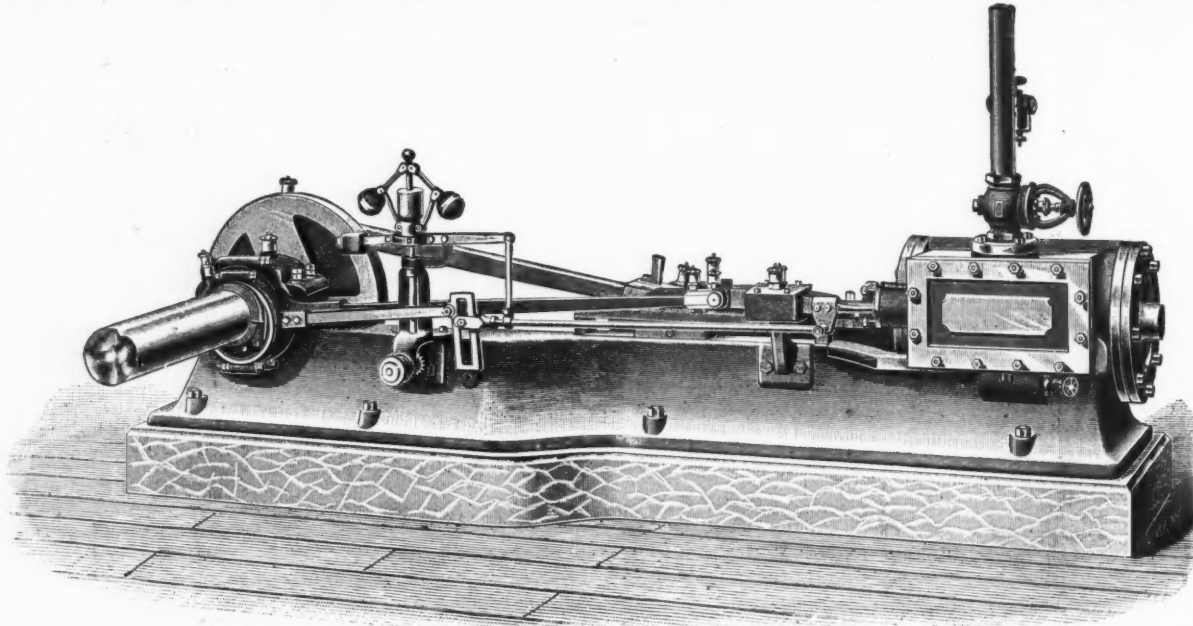
THE MINES AND MILLS IN PRIBRAM IN BOHEMIA—I.

Written for the Engineering and Mining Journal by John W. Meier M. E.

[In view of the accident which occurred on the 31st ult., by which it is said two hundred lives were lost, an account of which will be found in the mining news columns, the following article, the first of several which we have received from Mr. Meier who is now in Germany, will be found of opportune interest.—Ed. E. & M. J.]

A visit to the town of Pribram will prove of great interest to the mining engineer engaged either in the working of mines, in concentration or in the smelting of ores, or to the student preparing himself for either one of these branches of the profession. For, in the first place the mines are very ancient, having a long and interesting history. The experience gained there having been extensively published has assisted in the education of many professional men. Again the veins are true fissures, running to great depth, furnishing rich ores after having been mined for centuries (since 1330 according to records, but the manager of the mines claims they were opened in the ninth century), and thus exemplifying the possibility of fissure veins holding out for ages. For in this country there is quite a general belief prevailing that mining is a very uncertain venture, and it will please mining men to note another fact that will refute such charges by establishing the permanence of good veins.

The great variety of silver ores found, the mixture of other ores with them, makes the concentration and subsequent smelting more than ordinarily difficult, and the means adopted to extract the metals, after such long experience and study deserve the most careful examination. The Austrian Government owns the greater number of shares in this property, and it is under management of Government Commissioners (Bergrate), but are mostly mining men of high standing and large experience. Their subordinate engineers are likewise graduates of mining schools, for in Austria, as in Germany, there is a regular corps of mining engineers in Govern-



THE BENNETT AUTOMATIC ENGINE.

speed changes in the least, the line of travel of the balls is also changed—up, if the speed is increased; down, if decreased. And, by connection through the lever and rod, the position of the sliding block in the slotted arm is changed. If lowered toward the pivot, the travel of the valve is shortened, and steam is cut off earlier in the stroke of piston; if raised, the travel is longer and steam cut off later in the stroke. Thus the proper amount of steam for the work to be done is admitted to the cylinder, and the speed is controlled perfectly, regardless of variable steam pressure, variable load, or lubrication. The work of moving the valve falls entirely upon the eccentric, which must revolve with the shaft, the governor having only to change the position of the sliding block, which is frictionless. It is immaterial whether the valve is "balanced" or not, or whether the valve surfaces and joints at all times get the same kind and amount of lubrication, because the force which moves the valve is positive.

Referring to the adjustment of parts while the engine is running, it is often a matter of convenience to be able to change the speed without stopping the work. This can be done with the governor, by simply moving the small square weight on the lever, outward for more, and inward for less speed, or for greater or less cut-off, as the maximum of work may require.

The main valve of the engine has no variable travel. It moves always to the same point on the seat. The steam lead and exhaust cushion are constant under all circumstances.

The Change of Gauge on the Great Western Railway, England.—The broad gauge on the Great Western Railway of England is finally abandoned. The conversion to standard 4 ft. 8½ in. gauge was first commenced in 1868, and it is now completed by the conversion of the Exeter and Penzance line (260 miles). The cost to the company of effecting this last change in track and new rolling stock will be about \$5,000,000. Penzance is the center of the mining industry of Cornwall. This district has long suffered owing to the broad gauge, as in transporting the ores and products to other parts of Great Britain, it was always necessary to transfer the freight from broad gauge to standard gauge trucks when passing from one railroad system to another.

ment service, and these advance by regular promotion, as in other branches. Profits are large and means are not stinted to supply the best machinery and plants in all departments, and also to make the work as easy and safe for the workmen as the nature of the work will allow. Appliances all conform to the most modern standards; although one case, to which attention will be called further on, there would appear in, to the eyes of American engineers, a retrograde movement, the reason of which lies largely in the fact that wages are exceptionally low, labor being so abundant.

The town of Pribram has good railroad facilities, and is reached easily from Prague. The population is about 12,000, mostly Czech, but all officials at the mines speak German well, and visitors can get along with that language throughout Bohemia. There is a mining school, intended for workmen and foremen at the mines, besides other schools. To the south of the town, on a hill, is the Heiligenberg, a monastery with a shrine to which pilgrimages are made from afar, while to the west, on a similar elevation, lies the village of Birkenberg, where are located the principal shafts and dressing works.

Mining.—There is an uncertainty, as mentioned above, as to date when work commenced. In either case, whether in ninth or fourteenth century, we should call these mines quite ancient ones, and there are surface indications that gold was washed in a number of places along the outcrop of the principal veins. Bohemia was the theatre of many wars, and operations were much interrupted on that account. Mining had its ups and downs as in other districts and countries, but the veins were too rich to be abandoned, and at the present time everything is in a most flourishing condition.

There are eight working shafts and two prospect shafts, the names in part being those of saints and princes—i. e., Prokop, Lill, Anna, Maria, Franz Joseph and Adalbert. At the top improvements are all of most substantial kind—powerful engines for hoisting purposes, good buildings for the hand culling department, etc.; while, owing to the dryness of mines, but one shaft, the Prokop, has a large pumping plant. The hoisting machinery comprises 15 hoisting engines, 1 water-wheel and 6 whims, which together in the year 1887 raised 4,610,115 quintals metric, or 508,178 tons of 2,000 lbs. avoirdupois. (See official report published at Vienna for

1885-1887.) The air compressors employ 7 engines, total 150 H.P.; ventilation of mines requires one engine of 15 H.P., and the crushers three engines having total of 44 H.P., and one turbine wheel of 114 H.P.; the mines therefore require in all 2,396 H.P. steam and 114 H.P. of water power.

The shafts are noted for their great depth. Franz Joseph in 1879 was down 726 m., and in that year, to increase hoisting capacity, it was resolved to sink it 569 m. deeper to reach the thirtieth level; this work, to make greater speed, has been divided into several divisions. When completed this shaft will therefore be 1,295 m. = 4,294 ft. deep. The Adalbert shaft was started in 1779, and just one hundred years later it was completed to 1,000 m. depth; in honor of which event a celebration took place in presence of several members of the Imperial family. The Maria shaft is at present the deepest (1,129 m. = 3,704 ft.); it has two compartments, one containing the ore hoist (cage with safety brake, similar to those used in the United States), and the other the "kunst" (lift for the men), which is an improvement on the old machine used in the Hartz, the lines of poles lashed together with iron plates having been replaced by iron chains, and each footboard is large enough to carry two men.

The country-rock in the Maria stands well, so there is no timber or lining in the shaft, except in vicinity of shafts where ore is hoisted; in such places a lining of mason work has been put in. The descent down this fine shaft by cage is rapid and safe, the 1,000 m. level is soon reached and a tour of exploration of a couple of hours, during which the Adalbert shaft is seen, gives visitors a promenade of four kilometres (nearly 2½ miles); at that great depth the air being at all times cool and fresh, 76° F., except for short distances in cross-cuts between levels. The levels where stoping is done (back stope is used) have an arched roof of brick masonry two feet thick, and as ore is removed the rock is used for filling on top of these arches and stalls are taken out for use higher up; as timber is scarce in the neighborhood of the mines and enough rock is culled out to make the filling there is of course great economy in this.

The cheapness of labor is remarkable, wages underground per shift of eight hours being 1.30 florins (about 55 cents at present values). This is the reason why so much can be done to insure safety and permanence of improvements which cannot be thought of in other countries.

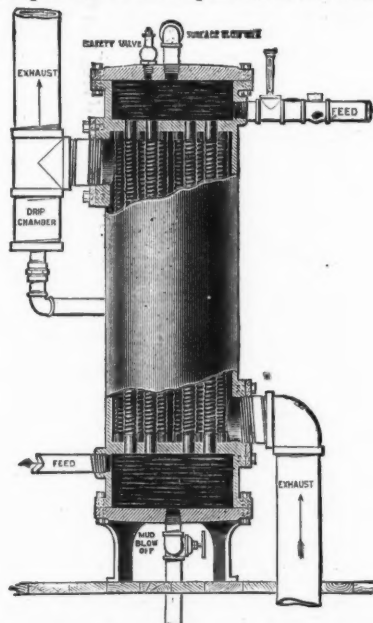
Ores are thrown down chutes in the usual way into mine cars standing on the level, and these are hauled, four to each horse, to the hoisting shaft. An improvement has been made at some of the landings in the way of partial classification.

From the level the car passes into a large chamber, in the floor of which is a strong grating of iron bars, on which ore is dumped. The wash dirt falls into a car below, which delivers it to the concentrator while the lumps remain on the grating and go to the cull house. The principal veins of the district run nearly north and south, while cross veins run northeast and southwest, but at intersecting points. The ore is generally poor. The veins pinch out and then come in again, as elsewhere, although the chutes generally hold out well. Nearly all work, stoping and driving, is done with power drills. Froehlich & Schramms machines were introduced in 1889, and gave good results as to speed and economy; pressure used is five atmospheres. Drills have the same shape as ordinary hand drills, and are 23 mm. wide (nearly an inch). The cross-shaped drills were first used, but abandoned in favor of the simpler form, and although the holes are not round they answer the purpose. Contract work prevails on nearly all the stoping and driving; men work eight-hour shifts, but owing to depth of shafts much time is lost. The number of hands employed in the mines and in culling is about 6,000, and the area of mining property of Pribram is 2,159.5 acres.

Dry weight of ore concentrates (culled ore) sold by mines to the smelter equals 14,926.7 tons (of 2,000 lbs. each), containing 1,157,791 oz. troy, and 5,820.5 tons lead. (Official report, years 1885-87, published in Vienna.)

WAINWRIGHT CORRUGATED TUBE WATER HEATER.

Hines & Robertson, of New York, are the agents for an improved feed water heater, as shown in the illustration herewith. The heater is of the straight tube type; it has an arrangement in the form of a settling tank which allows the deposition of the impurities in the water. The coil form



of tube has been extensively used heretofore, owing to its slight lateral expansion. In this straight tube heater this expansion and contraction and consequent leakage has been a formidable one. The inventor of this

heater by supplying corrugated tubes has overcome a difficult point. The feed exhaust, etc., will be readily understood from the engraving. The mud blow-off and surface blow-off are also plainly shown.

Mineral Production of Tunis in 1890.—Tunis has a number of coal mines which at present are unworkable. In 1890 there were mined 400 tons of lead ore and 2,700 tons of zinc ore, of a total value of \$46,450; 4,832 tons of salt were produced, worth \$7,600.

An Illuminating Projectile.—A young Italian has recently perfected an invention, under the direction of the Director General of Italian Artillery, which will prove of immense value in future warfare. It consists of a species of candle which produces a most intense light. This candle is intended to be projected from a cannon and to strike the enemy's works, or that part of the country where it is suspected they are. On striking any solid substance it breaks, and the substance contained in it, taking fire, produces a light estimated to be of the intensity of 100,000 candles, which illuminates the field for a great distance.

Quantitative Estimation of Gold by Hydroxylamin Chloride.—Prof. Alex. Lainer, in *Dingler's Poly. Jour.*, gives an extended account of his experiments on the precipitation of gold by hydroxylamin chloride. His method is to add first hydroxylamin and then potash to an acid (HCl) solution of gold chloride. A pulverulent precipitate is thrown down, the precipitation of which is accelerated by gentle warming. Agitation with a glass rod gradually clears the solution, the precipitate collecting as a brown mass. When no more precipitate forms, it is washed by decantation with hot water and finally transferred to a filter paper, ignited and weighed; 15 c. c. of a solution which gave 0.1275 gramme by precipitation with ferrous sulphate gave 0.1277 gramme on precipitation with hydroxylamin. The residue after ignition is pure gold.

The Campbell-Boyd Manganese Recovery Process.—Messrs. Campbell & Boyd have introduced an improvement into the Weldon process for recovering the manganese dioxide used in the manufacture of chlorine and bleaching powder. In making chlorine manganese dioxide is acted on by hydrochloric acid, with the production of chloride of manganese and chlorine. In the Weldon process this chloride of manganese is heated with milk of lime and a current of air, and the result is the recovery of the peroxide of manganese and the formation of calcium chloride as a waste product. Messrs. Campbell & Boyd propose to act on this calcium chloride with the sulphate of soda which is made in the course of the manufacture of hydrochloric acid from salt, the result of this reaction being the recovery of salt and the precipitation of a fine sulphate of lime. The whole of the chlorine of the original hydrochloric acid is thus recovered.

DIVIDENDS PAID BY MINING COMPANIES DURING APRIL AND FROM JANUARY 1ST, 1892.

NAME OF COMPANY.	Paid in May.	Paid since Jan. 1st.	NAME OF COMPANY.	Paid in May.	Paid since Jan. 1st.
Adams, Colo.		\$7,500	Helena & Frisco, Mont.		\$20,000
Alaska, Treadwell,		150,000	Homestake, S. Dak.	\$12,500	62,500
Alaska.	\$75,000	45,000	Horn Silver, Utah.		50,000
American Coal, Md.		30,000	Idaho, Cal.	3,100	9,300
American-Nettle, Colo.		20,000	Iron Mountain, Mont.		15,000
Argyle, Colo.		20,000	Kennedy, Cal.		30,000
Aspen, Colo.	20,000	40,000	Lake Superior, Mich.	252,000	252,000
Bald Butte, Mont.		20,000	Leadville Cons., Colo.	12,500	12,500
Bannister, Mont.		6,000	Lexington, Colo.	3,000	18,000
Belden Mica, N. H.	5,000	5,000	Maid of Erin, Colo.	139,725	139,725
Best Friend, Colo.	10,000	40,000	Maryland Coal, Md.		42,000
Brotherton, Mich.	20,000	40,000	Maxfield, Utah.	9,000	18,000
Bull-Domingo, Colo.		4,000	Minnesota Iron, Minn.	210,000	420,000
Bulwer Con., Cal.	10,000	10,000	Mollie Gibson, Colo.	150,000	650,000
Buxton, S. Dak.		20,000	Monitor, S. Dak.	22,500	22,500
Calumet & Hecla, Mich.		500,000	Morning Star D., Cal.	7,200	32,400
Centennial - Eureka,		15,000	Napa, Cal.	20,000	30,000
Utah.		60,000	New Guston, Colo.	82,500	82,500
Champion, Cal.	3,400	34,000	Omaha, Cal.	3,600	7,200
Colorado Central, Colo.	13,750	27,500	Ontario, Utah.	75,000	375,000
C. Consolidation Coal, Md.		205,000	Oscoda, Mich.	50,000	50,000
Colorado Fuel.		67,120	Pacific Coast Borax.	15,000	75,000
Cook's Peak, Colo.	100,000	200,000	Pandora, Mont.		3,000
Cortez, Nev.		95,000	Parrott, Mont.	18,000	90,000
Daly, Utah.	37,500	187,500	Plumas, Eureka, Cal.	25,313	25,313
Deadwood Terra, S. Dak.	10,000	50,000	Poorman, Ltd., Colo.	18,225	36,450
De Lamar, Idaho.	120,000	192,000	Quincy, Mich.		200,000
Diamond, Kyune & Castle, Utah.		7,500	Rescue, S. N., Mex.		12,000
Elkhorn, Mont.		87,500	Rialto, Colo.	4,500	18,000
Enterprise, Colo.	50,000	100,000	R'y Fork Coal, Mont.		100,000
Eureka Con., Nev.		12,500	Running Lode, Colo.	1,000	6,000
Farncomb Hill, Colo.	5,000	10,000	Sierre Butte, Cal.	14,700	14,700
Franklin, Mich.		80,000	Standard, Cal.	10,000	20,000
Golden Reward, S. Dak.	5,000	20,000	Tamarack, Mich.		200,000
Granite Mountain, Mont.	80,000	360,000	United Verde, Ariz.		30,000
Great Western Quick-silver, Cal.	12,500	50,000	W. Y. O. D., Cal.	3,000	15,000
Hecla Con., Mont.	15,000	75,000	Yosemite No. 2, Utah.		5,000
			Total.	1,786,513	6,046,708

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office:

TUESDAY, MAY 31ST, 1892.

- 475,747. Hydraulic Brick Machine. Johnston Beggs and Thomas A. Gordon, St Louis, Mo.
- 475,824. Process of Roasting Ores. Charles W. Stickney, Butte City, Mont.
- 475,833. Coal Cutting Machine. Isaac Wantling and James T. Johnson, Peoria, Ill.
- 475,889. Machine for Making Hollow Wire Cable. Othniel Preston, Hornellsville, N. Y.
- 475,907. Process of Refining Silver Sulphides. William G. Waring, Silver City, N. Mex.
- 475,913. Apparatus for Drilling Artesian Wells. Patrick Yorke, Washington, Pa.
- 475,972. Carburetor. Edgar B. Badlam, San Francisco, Cal.
- 476,001. Process of Purifying Metals. Benjamin Talbot, Chattanooga, Tenn.
- 476,162. Coal Cutting Machine. James H. McEwen, Ridway, Pa.
- 476,233. Roller Compressor. James Le F. Myers, Boston, Mass.

PERSONALS.

Prof. I. C. Branner, state geologist of Arkansas, has been visiting California, but is now on his way back.

Judge Niles Searles, chairman of the delegation sent to Washington by the California Miners' Association, was given a public reception at Nevada City on his return.

Messrs. Locke & Hasenzahl, diamond drilling contractors, of Cincinnati, O., have finished work in Central Kentucky, and have commenced a new contract near Wausau, Wis.

Mr. John Hays Hammond, president of the Bunker Hill & Sullivan Mining Company, has been visiting the mines in Wardner, Idaho, with a view, if possible, of settling the labor trouble in that camp.

OBITUARY.

Ex-Senator Albert R. Fox, of Sand Lake, N. Y., died recently at the residence of his son-in-law, Andrew B. Knowlson, of that village. He was at one time a prominent glass manufacturer and was connected with many important business interests. He was the fifth oldest living graduate of the Rensselaer Polytechnic Institute, in Troy, and was at one time president of its alumni association. He was in his 83d year, and up to the time of his last illness was a vigorous old man. He is survived by a son and daughter.

Walker S. Hobart, the mining operator, died in San Francisco on the 2d inst. He had been ill for several weeks, and death was due to heart failure. Hobart was a Vermonter, who went to the Comstock soon after the silver mines were discovered, and made a fortune in lucky speculations and the milling rings. He invested largely in San Francisco real estate. His fortune was estimated at about \$3,000,000. He was one of the defendants against whom Martin W. Fox last week gained judgment for over \$1,000,000 for frauds in the management of the Hale & Norcross mines. The adjudgment of this suit against him, as well as the mortification of the exposures during the trial, undoubtedly was the cause of his death. More sensitive than his co-conspirators, he could not survive his disgrace.

Lewis Morris Rutherford died on Decoration Day at his home, Tranquillity, N. J., in the 76th year of his age. He devoted special attention to astronomical photography and spectral analysis, and in 1863 published in the "American Journal of Science" a paper dealing with the spectra of the stars, the moon and the planets, the first published work of the kind after that of Bunsen and Kirchhoff, and the first attempt at classifying the stars according to their spectra. In the same year Mr. Rutherford was named in an act of Congress one of the members creating the National Academy of Sciences. He constructed a micrometer for the measurement of astronomical photographs, especially in solar or lunar eclipses and transits. The photographs of the moon made by Mr. Rutherford are notable among works of the kind the world over as being of great beauty and unsurpassed in perfection of detail. In 1864 he presented to the National Academy of Sciences a photograph of the solar spectrum obtained by means of bisulphide of carbon prisms. It contained more than three times the number of lines that had been laid down within similar limits on the chart by Bunsen and Kirchhoff. He constructed, in 1870, a ruling engine, only surpassed, perhaps, by the more recent productions of Prof. Henry A. Rowland, which produced interference gratings on glass and speculum metal. With one of these gratings, having about 17,000 lines to the square inch, he produced an important photograph of the solar spectrum. In 1887 he was invited by the French Academy of Sciences to become a member of the International Conference on Astronomical Photography, held in Paris in 1887, and was appointed by the president of the National Academy of Sciences as its representative, but was obliged to decline the honor on account of his failing health. Mr. Rutherford was an Associate of the Royal Astronomical Society, and, besides being a member of several foreign and domestic scientific societies, was the recipient of medals, orders, and diplomas almost innumerable.

SOCIETIES.

American Society of Civil Engineers.—The new regulation of the society concerning the publication of reports of its proceedings make it impossible to give intelligible accounts of the papers read or of the discussions, as the new rules limit us to a bare abstract of the proceedings. On the 18th May a paper was read by Mr. W. W. Maclay on "Hot Tests for Determining Change of Volume in Portland Cement." On the 1st June two papers were read, on "Wind Bracing in High Buildings," by Mr. H. H. Quimby, and "A New Formula for the Strength of Columns," by Mr. A. J. Du Bois. The first paper mentions the wide variation of practice among architects, and shows that ideas differ not only in regard to details, but as to the amount and operation of the forces to be resisted. There is a substantial agreement among engineers as to the design of metal structures, the greatest differences being as to the use of cast iron, and the relative merits of hollow tile walls and of iron or steel rods

as vertical bracing. Some architects depend for lateral stability wholly on ordinary partitions, no matter how much weakened by openings. The greatest difficulties arise in cases of yielding foundations. The idea that the exterior walls are a mere exterior curtain to shield the interior metal frame is correct, if this interior frame be efficiently braced, but not otherwise. A building 200 ft. high and 60 ft. wide is mentioned in which the rear wall is 13 ins. thick and is but little else than a grand window frame. The front from the third to the fifteenth floor is of the same thickness, and has two bay windows, which, owing to their curved form, can offer little lateral resistance. The vertical bracing consists of interior partitions made of hollow tiling, the united thickness of the webs being 2 1/4 ins. An illustration is given of the connections between the vertical and horizontal members of the iron framing, showing their inherent weakness to resist deformation by a lateral force. The action of such a force is discussed, also the wind pressure against which it is desirable to provide. The question of imperfect workmanship as affecting stability, as also that of vibrations due to cars, trucks and dynamos, is considered; also the possible occurrence of earthquakes, with the best method of guarding against them, and the great danger from deficiency of wind bracing to which many buildings used for manufacturing purposes are exposed by reason of large floor areas without partitions, and from the regular vibrations of machinery. The paper by Prof. Du Bois gives a formula which is claimed to be more accurate and to possess a wider scope than those in common use. The official abstract, however, does not give the formula itself. It is based upon the length and cross-section of the column, its physical characteristics, and the end conditions. The discussion is theoretical, and results in the establishment of three formulas, respectively for long, intermediate and short columns. The first and third when plotted give curves, and the second a straight line. The constants in these are: the breaking unit stress in the outer fiber from compression, the modulus of elasticity, and one depending on the end conditions.

EXPORT NOTES.

There is no direct communication between the United States and Morocco; nevertheless American goods to the value of \$129,050 were imported from England and Gibraltar, as follows: Raw cotton, \$40,400; staves, \$2,000; furniture, \$1,100; hardware, \$750; petroleum, \$30,900; tobacco, \$30,000; lard and preserves, \$6,000; firearms and ammunition, \$40,200; also various small lots of smuggled rifles, whose value I have not been able to ascertain. The aforesaid articles are credited in the returns as imports from England. Besides these, there are other articles of American production which only reach this country through second and sometimes third hands, such as deal planks, preserved provisions and many fancy articles, which are brought from France, Germany and Gibraltar; thus proving that were these articles not hampered with the heavy percentage of duties paid in the countries through which they pass, and the profits of those who import them from the United States, a greater and more profitable trade could be done either direct from the United States to Morocco or in transit via Gibraltar. The chief difficulties in the way of establishing direct trade between Morocco and the United States have been the want of steam communication, the absence of American agents or agencies and the possession of markets by England and France. These difficulties, however, have met us everywhere, and they should be no more difficult to overcome in those countries than elsewhere. Where other producers and manufacturers introduce their trade we should be able to secure a footing by using similar methods. It is only a few years since Germany, for the first time, began a small trade which was carried in foreign bottoms which gradually increased, thus inducing the establishment of two direct lines of steam communication between Germany and Morocco. Even with the present lines of steam communication (the Anchor and Florio Rubatino, whose steamers call at Gibraltar several times a month), a start could be made which would soon induce them to call at Tangier on their way to and back from New York to the Mediterranean. Our manufacturers and producers would find it worth their while to try and make an opening for their productions in this country, which represents not only an important empire, but, under normal circumstances, the high road to many districts bordering on Central Africa, whence great caravans come twice or thrice a year to meet traders at Wadnoon and Ait-Bau Amran. I feel confident that our manufacturers and producers can compete advantageously with those of European countries, as is proved by the fact that many American articles find an easy sale in Europe itself.

Here are a few of the industries which it would be profitable to establish in Mexico. In the textile industry there is yet room for some common articles of woven stuff, cotton thread for the manufacture of women's scarfs and cloaks, quilts, napkins, and common articles of stockings, quantities of which are yet imported into the country. Articles of finery could be manufactured which come into Mexican territory under enormous duties. The sugar industry is very backward, and the use of steam is limited to a few factories which concentrate and crystallize in vacuums; for that reason, Mexico is an ideal country

for the sugar industry. The distilling industry is in no better condition than the sugar industry. The casting of iron is limited to common iron and iron for plows, though some shops have already manufactured water wheels and sugar mills. The paper industry is limited to the manufacture of packing paper, pasteboard and print paper. The fibers here are excellent and abundant. Mexico, notwithstanding, is dependent upon foreign countries for at least one-half of its consumption; moreover she imports old rags for the best quality of paper which she manufactures. Flour mills are very numerous in the country, and there are some well equipped; others still use the primitive millstone. Mexico is one of the largest producers of common woods, and particularly of fine woods for cabinetmakers, and, in spite of it all, articles of cabinetwork come from foreign countries burdened with import duties, cost of transportation, commission, losses in exchange, etc., which increase their original cost from 300 to 400%.

These duties vary from 15 to 35 cts. per kilogram, gross weight. Furniture of bent wood, like that manufactured in Vienna, is used by the middle class. Articles of ceramics and glass enjoy a protection similar to that of furniture. What is manufactured in the country is the coarse kind, except glasses, bottles, and a few other articles. The raw material is very abundant. There is no factory of jewelry and trinkets in Mexico; all of these articles sold in the country are of German importation. The import duties on articles of jewelry vary from 30 cts. to \$2.50 per kilogram.

The industry of chemical products is not yet numerous, considering that products like muriatic acid are so necessary. In the whole of Mexico there are not more than two factories of chemicals. One kilogram of native sulphuric acid sells at 14 cts., and it costs the Mexican manufacturer not more than 5 or 6 cts. The raw material is found in great abundance in the vicinity of the volcanoes.

To give an idea of the small importance of Mexican industries it suffices to look at the number of workmen employed in the different industries. This number does not exceed 15,000. The two industries that employ the most hands are those of glass and paper. The principal articles are common cotton domestics, which production increases every year in considerable proportions. The cassimeres of the country, the common as well as the better ones, improve from day to day. French capital would find plenty of employment in building up new industries, which would not fail of prospering if conducted intelligently. The industries would find raw material in abundance, hands at a fair price, a decided protection, and about 12,000,000 of consumers. Furthermore the machinery used in these factories comes into the country free of duties. French capital might find profitable employment in engaging in mining and agriculture, but perhaps with less certainty.

In France it is generally believed that all the natural richness of Mexico consists in mines; and this is a great mistake. Without underrating in the least the value of the mines of silver, gold, lead, iron, mercury, platinum (recently discovered), nor that of the veins of marble and onyx, of the opals and precious stones, it can be asserted that the true richness of Mexico is in her agriculture. Hennequen, ramie, ixtle, agave, and other fibrous plants, coffee, vanilla, tobacco, the greatest varieties of fruits of certain kinds susceptible of transportation, mahogany, palisander and other precious woods, plantations of caoutchouc (rubber) trees, vineyards, plantations of mulberry trees for the raising of the silkworm (more than 5,000,000 of mulberry trees have lately been planted by a Frenchman named Chambron), and a multitude of other things; all this requires relatively only a little effort and little capital to organize quickly and to attain in a short time considerable benefits. Those who possess plantations of hennequen obtain to-day an income which only gold mines are capable of producing. It is necessary that these efforts be undertaken in a methodical manner and with perseverance, and that the capital be expended with discretion; but capital here, as well as in other parts, is wanting to establish agricultural enterprises and to make them productive, and when the yearly produce is so high and capable to pay for the outlay in a few years, it is still necessary that this outlay be made, and that he who does manage it can do so and live in expectation of the time when it will pay.

WORLD'S FAIR NOTES.

Mr. William Saunders, Executive Exposition Commissioner for Canada, says that a large and excellent exhibit from the Dominion is assured, especially notable in minerals and manufactures.

The H. C. Frick Coke Company, of Pennsylvania, has decided to make a complete working model in miniature of its entire plant. The machinery will be in operation, the motive power being electricity, with gas for the ovens, the coke being represented by asbestos.

The Exposition, probably, will not have an Eiffel tower or anything approximating it in height, except the elevation to which the captive balloons will ascend. There will be, however, three observation towers about 300 ft. high for the accommodation of

visitors, who want to take a bird's-eye view of the grounds and buildings. These towers will be of elaborate design and beautiful in appearance and will cost about \$200,000 each.

One of the most notable features of the World's Fair at Chicago next year will be a complete model of the entire plant of the H. C. Frick Coke Company, of Scottdale, Pa. This company employs about \$40,000,000 capital in their business, and is the largest of the kind in the world. The contract has been let to the Jones Bros. Company, of 30 Court street, Cincinnati, O., who are experts in the making of models. The estimated cost of this model is between \$3,000 and \$4,000. The plant will occupy a space about 20x50 ft., made on a scale of one-twentieth of an inch to the foot, and will be an exact facsimile of the original, including boilers, engines, piping, elevated tracks, cupolas, cars, and all other machinery, and will be in operation. The motive power, however, will be electricity.

The chief motive power for the machinery at the Exposition will be supplied by a large engine, to be furnished free to the Exposition by the E. P. Allis Company, of Milwaukee. The engine will be furnished as a part of the company's exhibit, upon a special contract providing that it shall be used for the motive power, and that no other engine of equal size shall be exhibited. It will be an engine of the quadruple expansion type, and will be of between 3,000 and 4,000 H.P. Compared with this engine the big Corliss that was exhibited at the Centennial Exposition is almost a dwarf. In 1876 the Corliss was considered one of the wonders of the Exposition, but its builder rated it at only 1,400 H.P., or less than half of the one being built by the Allis Company. The Allis exhibit represents an outlay of \$175,000.

Ex-Senator Morgan B. Williams, of Wilkes-Barre, Pa., who has taken charge of Pennsylvania's coal exhibits at the World's Fair, has planned the following excellent features: A pyramid cut from the largest anthracite coal vein; specimen blocks of anthracite coal; blocks from some of the largest bituminous and semi-bituminous coal mines, showing in practicable the full size of the veins; a working model, with plans and drawings, of a coal mine, representing the latest improved methods of mining; a working model of a coal breaker; maps and photographs of leading coal fields; statistics of the coal, iron, ore, coke and stone industries; state publications relating to mines, mining, geology, etc., and illustrations of the coke industry. It would be highly desirable to have these features located in a special building built of anthracite and bituminous blocks, and the project may yet assume that shape.

The gold and silver and other mineral exhibits at the Exposition will probably aggregate in value several million dollars. In exhibits of this description it is expected that Colorado will take front rank. It is announced that the gold and silver nuggets to be shown by that State alone are worth \$250,000. There has been made a splendid collection of native gold specimens, from all the rich mining districts. A single collection, valued at \$60,000, has already been secured. This will be supplemented by the finest collections, secured as loan exhibits. The exhibit will be both technical and economic in its character, showing a scientific classification of the mineralogy of Colorado and a correct presentation of its geology. At the same time a popular and massive display of ores, building stone, commercial clays and other mineral products will be made. Models, maps and diagrams will be employed to show the progress made in mining. These will be accompanied by historical data and reliable information regarding the product and formation of veins in the mining districts. In the display will be the "Silver Queen," a beautiful statue of an ideal female figure executed in silver and valued at \$7,500 to \$10,000.

The prospect is that the Engineering Congress, which is to be held in Chicago in 1893, under the auspices of the World's Congress Auxiliary, will be a gathering of very great scientific importance. Of the \$15,000 estimated to be necessary for its expenses, \$10,000 have been raised. Many of the most prominent engineers of the world have accepted memberships on the Advisory Council, among whom may be mentioned William H. Maw and James Dredge, of London "Engineering"; Don Fernandez Leal, president of the Mexican Society of Engineers and Architects; Sir C. S. Gowzski, of Canada, and others. Chairman Corthell, of the general committee, who went to Europe last fall in the interest of the congress, invited 36 engineering societies to participate by sending delegates. About 27 of these societies have accepted, and not a single declination has been received. He received on all sides expressions of great interest in the coming congress, not only from the engineers composing these societies, but from the engineers of the governments of Europe, France, Germany, Holland and Belgium. The interest in the congress among the engineers of Great Britain and the officers of the great engineering societies of that country was not less than that shown on the continent. In fact, the promise of support and expression of a desire to attend were universal. Among the large societies which accepted the invitation were the Mechanical Engineering Society and Society of Civil Engineers and Architects of Germany. Each of these societies has a membership of about 6,000.

INDUSTRIAL NOTES.

The White River Iron and Steel Company, of Muncie, Ind., has put its 8-in. mill in operation under the management of Thomas Taylor, formerly of Youngstown, O.

The Cambria Iron Company, at Johnstown, Pa., has put in operation its new billet mill, which is located south of the present 40-in. bloom train in the same building.

At the annual meeting of the Decatur Company, Decatur, Ala., last week, the sale of the furnace was confirmed, and the purchasers will probably put it in blast about July 1st.

Work was resumed on the 1st inst. in the Oxford Iron and Nail Company's Works at Oxford, N. J., after an idleness of six months. The puddlers have promised to make six heats. Some of the strikers threaten to interfere.

At the annual meeting of the stockholders of the Anniston, Ala., Rolling Mills, held last week, Robert Fraser, John McKefroy, J. J. Willett, T. L. Houser and W. W. Stringfellow were elected directors. Robert Fraser was afterward elected president and W. E. Robertson secretary and treasurer.

H. B. Plant will construct a wharf at Port Tampa 6,000 ft. long, with 24 ft. of water its whole length. It will be provided with a warehouse 2,400 ft. in length, which will permit the loading of 50 vessels at the same time. The earth from the excavation will be used to make a solid wall 160 ft. wide for the accommodation of six tracks. He will also erect a phosphate elevator with sufficient capacity to load 100 tons per hour.

The Montauk Iron Works, of Brooklyn, N. Y., is mailing a new illustrated catalogue on the subjects of pulleys, shafting and power transmitting machinery. The book contains much valuable information regarding estimation, ordering and installation of devices for transmission of energy. Ten pages of the book are devoted to tabulated matter regarding pulleys and their capacity. The table for estimation of the horse-power of belts is valuable to all interested in power transmission.

Professor J. B. Johnson, of Washington University, St. Louis, states that the greatest elongation he has ever found in wrought iron is 34% in the stay-bolt iron made by the Falls Hollow Staybolt Company. In tests he made with this iron he found the elastic limit to be 28,300 lbs. per square inch and the breaking strength 49,200 lbs. per square inch. The fracture shows a pure fibrous unlaminated and uncrystalline structure, and it is eminently suited for its purpose.

Palliser, Palliser & Co., architects and publishers, 24 East 42d street, New York City, have issued a late edition of their specification blanks, consisting of masons, carpenters, slaters, tinners, plumbers, steam and hot water heating, electric light and gas lighting, burglar alarm and gas pipers' specifications for brick or frame building, costing from \$10,000 to \$50,000. The form is excellent and embracing, and will save much time and labor for the contractor and architect, as well as the builder. Another very desirable feature about them is that they are entirely legal in form and have stood the tests for many years.

The stockholders of the Woodstock Iron Company, Anniston, Ala., held their regular annual meeting last week and elected J. W. Noble, Wm. Noble, F. L. Robertson, J. D. Probst, T. G. Bush, A. L. Tyler and W. G. Ledbetter directors, who then elected W. G. Ledbetter president, J. W. Stillwell secretary and S. N. Noble general manager. T. G. Bush, Wm. Noble and A. L. Tyler were appointed a finance committee, and H. M. Caldwell, H. C. Thompkins, E. F. Howell, W. G. Ledbetter, T. H. Aldrich and T. G. Bush a committee on reorganization.

The contract has been let and work commenced on the first coke iron furnace in Texas. The Llano Steel Furnace and Manufacturing Company, with a capital stock of \$600,000, are the projectors of the enterprise. This company are composed of Eldwell Eastman and R. D. Smith of Birmingham, Ala., J. H. Moore, of Nashville, Tenn., and others. Mr. Eastman, president of the company, is one of the pioneer iron men of Alabama. He was one of the organizers of the Trussville Furnace Company, the Attalla Iron and Steel Company and other iron enterprises in Alabama and Georgia. Messrs. Smith and Moore are also largely interested in Alabama and Tennessee furnaces. The new furnace will be located at Llano, and work on it will be pushed as rapidly as possible. It will have a daily capacity of 50 tons.

A large water power installation has recently been made by the Pelton Water Wheel Company in one of the Comstock mines at Virginia City, Nev. The wheel is 36 ins. in diameter, made of solid steel disc, with the buckets riveted on the periphery in a way to afford absolute security, weighing complete 180 lbs. It is running under a vertical head of 2,100 ft., equal to 911 lbs. pressure; 460 ft. of this head is obtained from the pipe line of the Gold Hill Water Company, and the remaining 1,640 ft. from the California and Consolidated Virginia shaft, down which the pipe line is run to the Suro Tun-

nel level, where the power station is located and through which the water discharges after passing over the wheel. The wheel runs at 1,150 revolutions, with a peripheral speed of 10,804 ft. per minute, or about 120 miles per hour. The construction of the wheel amply provides for the centrifugal strain the velocity of the water gives it. A nozzle tip 1/2-in. diameter gives under above conditions 100 H.P. Every miner's inch of water, equal to a flow of 1.6 cu. ft. per minute, gives 5 H.P., while 1 H.P. is given for every 2 lbs. of metal in the wheel.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column, and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME.

2,686. A lath mill and bolter combined, capacity 25 M. to 30 M. Virginia.

2,687. An engine and boiler of about 12 or 13 H. P. South Carolina.

2,688. A 50-saw gin feeder and condenser; also a large roller gin for ginning long cotton (Sea Island). Georgia.

2,689. Forty-pound rails for broad gauge road, 35 miles long; also a 35-ton locomotive, fishplates, spikes, dump cars, logging cars, etc. Florida.

2,690. Stave mill, shingle mill and sawmill, with a capacity of 100,000 ft. per day. Florida.

2,691. Hoisting engine, screens, dryers, crushers, pulverizers, etc., for phosphate rock. Florida.

2,692. Eleven and a half miles 35, 40, 45 or 50-lb. steel or iron rail, old or new, and may be mixed lots; also nails and fastenings for above. Virginia.

2,693. A second-hand 30-ton freight locomotive and tender (if in good order), standard gauge about 14x20 in. cylinders. Virginia.

2,694. Five to ten flat cars, standard gauge. Virginia.

2,695. Sawmill, engine, locomotive and cars for logging; also working machinery, boiler, feeder, etc., either new or second-hand. Virginia.

2,696. An 18-in. turbine water wheel and a 25-H. P. return flue boiler and automatic engine; either new or second-hand. South Carolina.

2,697. A saw hammering outfit; also a 56-in. circular saw. South Carolina.

2,698. Estimates for a charcoal iron blast furnace; capacity 75 or 80 tons. New York.

2,699. Diamond drill (2 in. core) complete. New York.

2,700. A small quartz mill or pulverizer or combination plant, crusher and pulverizer, for use on phosphate rock, quartz and plumbago. Texas.

2,701. A steam revolving case crane; either new or good second-hand. Florida.

2,702. A 45 H. P. second-hand locomotive boiler. Maine.

GENERAL MINING NEWS.

ARIZONA.

Cochise County.

Mountain Key.—At a depth of 50 ft. a body of ore, the extent of which cannot be determined, has been struck. The whole width of the shaft, 4 1/2 ft., is in ore. It is a chloride and sulphide. Chunks of black metal can be cut with a knife, and horn silver is visible all through the rock.

Pima County.

Mammoth Gold Mines, Limited.—The 50-stamp mill belonging to this mine is running steadily and turning out bullion regularly every month. Some chloriding is being done in Bunker Hill district, east of the Mammoth, across the San Pedro River. The talk is that there will be considerable work done over there this fall; however, this is all a rumor, but the prospects are good, and the probabilities are that much chloriding will be done—everything indicates it.

Yavapai County.

The Hillside mines have been purchased from John Lawler and Ed. W. Wells by the representatives of a New York syndicate, who intend to vigorously work these very valuable properties under the management of a member of the well known firm of Rickard Bros.

Both 35-ton stacks of the smelter at Jerome are

running full blast, and preparations are being made to start the 100-ton furnace and reverberatory. The company's people openly announce that every furnace about the works will start as soon as they can be made ready.

ARKANSAS.

Montgomery County.

Lost Louisiana Mine.—There is considerable excitement in Montgomery County over the discovery of a vein of gold ore in the Lost Louisiana mine. Governor Eagle has telegraphed Professor J. C. Branner, State Geologist, now in California, to come and make an official examination. Colonel M. F. Locke, commissioner of the bureau of agriculture, mines and manufactures, says the find is in no way exaggerated. The ore assays all the way from \$3.50 to \$110.

CALIFORNIA.

Alameda County.

Oil has been discovered on the Hardin Ranch, near Pleasonton.

Amador County.

The Amador County Miners' Convention convened in Sutter Creek May 19. The following resolution was adopted and forwarded to Washington: "Resolved, that the Amador Miners' Association considers the anti-debris question of the greatest importance to all sections of California, and that the interests of the whole state demand that Congressman Geary, as representative of the first district, use all energy and endeavor to have the hydraulic mining bill passed." The following resolution was also adopted: "That this association considers the adoption of a universal code of signals essential to the mining interests of the whole state, and at the next meeting the president appoint a committee to draft a set of signals and report the same for approval to the following meeting."

Amador Gold Mine.—A speedy settlement of the legal troubles in which this property has been involved for nearly two years is expected. This week the lien men—those whose liens were for labor—were all paid off by John P. Darling, the representative of the American stockholders. The amount paid is something near \$4,000. Reports are flying around that the two contending factions—the American and English shareholders—have reached a satisfactory basis of settlement, and that all the claims will ere long be paid. Indeed, the payment of these liens is a pledge that the other debts will be settled. The men who received their money this week agreed to throw off the interest. It is thought likely that matters will be arranged so as to start up the mine again this summer. Cochrane, the principal English stockholder, has received a sheriff's deed to the Amador Queen mine, and paid the taxes on that property last week. This is believed to be a really good property, and if incorporated with the Amador Gold Mine—which doubtless it eventually will be—there are strong reasons for believing that a big and remunerative property would be the outcome.

Median Mining Company.—J. R. Tregloan has received a dispatch stating that the Supreme Court of the United States has reversed the decision of the lower court in the case of South Spring Hill Mine vs. Median Mining Company. The lower court held that a mining company had no right to follow their vein into agricultural ground patented before the mine was located. The Supreme Court settles the point in favor of the mineral claimant.

Nevada County.

California Mining Company.—At a meeting of the directors of this company, held recently, it was decided to permanently suspend operations, the outlook in the mine not warranting further expenditure. Under its articles of incorporation the company can work any mine, and in all probability the stockholders will meet in a few days and agree to remove their plant to and develop another and more promising property.

General Grant Mining Company.—The stockholders of this company of Columbia Hill district held their annual meeting recently and confirmed the sale of their 10-stamp mill, two patented claims and a quantity of mining material, to the King Solomon Mining Company. The mill cost \$12,000 and is favorably situated for use by the latter company, which has paid for all it has purchased.

COLORADO.

Gilpin County.

According to the Central City "Register-Call," the stamp mills along North Clear Creek have been well supplied with ore. The Randolph has 15 stamps running on ore from the Fiske, 15 on National, 10 on Golden Treasure, 5 on Hecla, 5 on Conlee-Burroughs. The New York is running 75 stamps, as follows: 20 on Pewabic ore, 10 on Fiske, 10 on Ivanhoe, 10 on Justice and 25 on miscellaneous lots. The Bobtail is running 50, Polar Star 40, Meade 40, Hidden Treasure 75, St. Louis-Gunnell 15, making a total in that locality of 345. Counting the Daisy 15 stamps in Gamble Gulch, and the Peterson 15 stamps in Lump Gulch, there are 375 in operation, the same number as the preceding week.

Bureau of Mines and Mining Industry Company, Central City.—This company was recently incorporated to buy, sell, lease and bond mines and mining property, to superintend mines and to act as agents, care for mining and manage properties, examine titles, furnish abstracts, make reports, and such

other work. The directors are Robert A. Campbell, Frederick Kruse, William O. McFarlane, W. J. Thomas and Claude E. Street, all of Central City.

Claudia J. Mining Company, Central City.—This company has given a two-years' lease of the Claudia J. mine near Wide Awake, Hawkeye district. The lessees have let a contract for sinking the main shaft to a farther depth of 50 ft.

Rialto Mining Company, Central City.—Sinking the main shaft on the Rialto has ceased until a new plat can be cut at a depth of about 400 ft. and levels extended 25 ft. each way. That work completed, another 100 ft. will be sunk. The miners have passed through a good body of ore in the last 100 ft., says the Central City "Register-Call." The vein matter on the hanging wall carries some lead, while on the foot wall there is a vein of fluxing iron.

Lake County.

Maid of Erin Silver Mines, Limited, Leadville.—Late advices from Leadville are to the effect that after protracted negotiations the management of this company has completed arrangements for the operation of the La Plata smelter by improved processes which will enable it to handle in a much more satisfactory manner the low-grade product of the mine. Simultaneously with this announcement it is stated that the Maid will put a large force of men to work on the lower workings of the property, which have for some time past been undergoing improvements. More than a year ago the Sixth street shaft people were forced to abandon their property on account of the rapid inflow of water, and since the resumption of operations it has been their aim to regain the ground lost at that time. At length they have been successful, and the 415-ft. station has been reached. It is expected, if nothing serious occurs, that the bottom of the shaft will be reached shortly.

Silver Cord Combination Company, Leadville.—At this property the tunnel is now over 4,000 ft. in length, but it will be carried on immediately to connect with the incline run from the 500-ft. point in the Mike & Starr to the east of Iron Hill, and in so doing will open up to a great extent the Goodell, Gardiner and several other contiguous properties, and will thus act as an outlet for the ore from those mines. After connecting with the Mike & Starr incline, which property will probably thereafter be developed from it, the tunnel will be eventually carried into the Breece Hill, thus opening up a section of ground at least 10,000 ft. in length.

Las Animas County.

Gray Creek, Trinidad.—For some time past negotiations have been going on for the construction of a new railroad connection with this mine, which has been idle for a considerable time. J. R. Deremer & Co. have announced that they have taken the contract for the grading and that work will begin at once.

Ouray County.

American Belle Mines, Limited.—The directors have issued their first report, with the balance sheet and revenue account, for 13 months ending Dec. 31st, 1891. The latter shows a balance of expenditure of £10,429 11s. 5d. On Dec. 1st, 1890, the company entered into possession of the property, and the purchase was completed on March 5th, 1891. During the months of December, 1890, and January, 1891, the returns were very good, and Mr. Crawford's letters and cables to the board, bearing on the prospects of the mines, were of the most favorable character. The remittance made by the resident director in March last enabled the directors to pay an interim dividend, on April 15th, of 6d. per share. At that date it was fully expected that the high grade silver ore would continue and provide the necessary profits for the payment of subsequent dividends, pending the erection at Durango of a smelter to treat copper ores, which it was then anticipated would be in working order last autumn. The ores in the property are of similar character to those obtained in the neighboring New Guston and Yankee Girl mines. High and low grade ore frequently interchange with each other, and suddenly affect the value of the returns. A portion of the metalliferous product, now held in reserve, consists of ore rich in copper sparingly associated with sulphide of silver. The nearest point at present for the sale and special reduction of these ores is Denver, distant about 500 miles from the mines, and the freight and smelting charges prevailing there since the formation of the company have rendered any shipments of these ores quite impossible. As soon as the copper smelter is erected at Durango, about 59 miles distant from the mines, it is confidently expected that they will be advantageously sold and treated at that place. The reports of Mr. Crawford and Mr. Harvey describe the developments made, and state the general result as well as the prospects of the undertaking. The superintendent, Mr. Harvey, has been instructed to push the exploratory works, with the view of not only increasing the reserves of ordinary ore, but of finding deposits of high grade silver ore. The surface and underground improvements have been considerable. In March, 1891, the directors acquired the Monte Cristo and Hercules claims, and Mr. Crawford has given to the company other claims. The advances made for working expenses by Mr. Crawford necessarily became a source of anxiety, but Mr. Fred. P. Crowther, one of the directors, and Mr. J. Wilkinson, solicitor, visited New York, and an agreement was made as regards these advances, which not only releases for development

purposes the capital in hand and uncalled (1s. 6d. per share to be shortly called up), but proves Mr. Crawford's confidence in the company's near future. By this agreement, dated April 11th, 1892, between the company and Mr. Crawford, a sum of £21,377 2s. 2d., part of this item of £22,075 19s. 9d., is only payable out of profits, and in no event out of the capital of the company. The agreement also provides that the said amount is only payable to Mr. Crawford (without reserve) in the event of the company having before Oct. 1st, 1894, received net profits sufficient to pay dividends to the shareholders at the rate of 10 per cent. per annum as from Oct. 1st, 1892. By this agreement, Mr. Crawford has waived all claims to be paid out of profits made subsequent to Oct. 1st, 1894, on which date any portion then outstanding is canceled. The agreement also embodies arrangements as to the carriage and smelting of ores, and the arrangements of the mines generally. Mr. Crawford in a report says: "I believe in the American Belle properties. There are very large bodies of ore, and after having the smelter in operation, believe that these properties will be able to return to the shareholders a very good revenue in the way of dividends."

Gaudalupe.—Probably the largest and heaviest single specimen of ore ever brought to Ouray is the one sent from the Guadalupe recently. It is for the World's Fair at Chicago. The weight is 3,050 lbs., and it is supposed to carry 30% copper, about 80 oz. in silver, and a few tenths in gold.

Ironclad Mining Company, Ouray.—From this company's property six carloads of ore have been shipped within the past two months, which averaged between 3 and 4 oz. gold and between 7 and 8 oz. silver per ton. The tunnel is now in over 100 ft., and is being driven through an ore body 6 ft. thick.

Ironclad Mining Company.—Manager William Weston, of this company, stated to the Denver "Republican" that about \$2,000 in gold have been taken from a cave about 50 ft. long by 6 ft. high and 6 ft. wide. The tunnel now being driven ahead is in six feet of ore which runs from one ounce to an ounce and a quarter in gold, and from five to ten ounces in silver. The tunnel has been running in this ore for 15 ft. On the south side of the cave a face of ore has been exposed, which by assay runs 20 per cent. in copper, and \$12 per ton in gold and silver. The casing of the cave, which is solid ore, runs two ounces in gold and from five to seven in silver, per ton. The mine has had four carloads of average sample ore treated at the Boston and Colorado Smelting Works, and it is claimed that the above showings are made from assays of this ore, and not from picked specimens.

Mickey Breen Mining Company, Ouray.—A good find was made recently in the Mickey Breen mine on the main vein and at a depth of 800 ft. It is high grade, free smelting galena, with yellow and gray copper. A car of good ore from the third level was shipped last week.

Pueblo County.

The Pueblo Mining Exchange was formally opened at Pueblo last week. Platt Wicks is president, A. G. Holland, vice-president, and Ed. R. Chew, caller. A large number of stocks are already listed.

Summit County.

Cashier-Champion.—Electricity is to be introduced in this county at this mine at the head of the Snake River above Montezuma. An electric railway will be constructed, electric mining apparatus installed, and it is expected the plant will be ready for operation before winter.

IDAHO.

Boise County.

Horn Silver Mine.—In this mine the ledge is found to be 4 ft. wide, with a pay streak averaging 2 ft. in width. The Elmira Company's mines are turning out their usual quantity of bullion, reaching nearly 1,500 oz. of silver per day. During the many years in which the company has been working these mines the output has not been less than 1,000 oz. a day. Both mines in the vicinity of Banner have been developed to the depth of nearly 600 ft. A new tunnel is being projected to tap the Banner at a still greater depth. When completed it will be 3,700 ft. long. It is now in 1,000 ft. The vein in the Banner mine is small but exceedingly rich. The last crushing run 1,500 oz. of silver to the ton.

Custer County.

Hub Mining Company.—This company is shipping in hoisting machinery, and about 40 men will be put to work in a short time, as we are informed. The Hub is one of the best developed mines in that noted district, and has, it is said, large quantities of good ore in sight.

Silver Brick.—This mine closed down Sunday evening for an indefinite period. There is about 100 tons of ore out at the mine, but it cannot be packed away much before July on account of the deep snow.

Kootenai County.

Panhandle Mine.—A one-half interest in this mine, which is located at the head of Fisher Creek, in the American Kootenai, was recently sold to Louisville, Ky., parties for \$10,000. The other half-interest is owned by Missoula parties. The vein is in a contact between quartzite and talcose slate.

Owyhee County.

Claucauqua Mine.—The tunnel on the Claucauqua at De Lamar is now in 130 ft. of ledge with no hanging wall as yet in sight. The ledge is formed largely

of low grade ore, but is streaked with seams 6 ins. in width which will mill from \$10 to \$40 per ton mostly gold. The main tunnel is in 1,000 ft. and perfectly straight. It is past the summit of the mountain already and within 500 ft. of the daylight on the opposite side. It will be continued through to strike the Beck ledge, one of the best surface showings on the mountain, which is only about 100 ft. from the present face of the main tunnel.

KANSAS.

Cherokee County.

During the week ending May 28th the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 2,617,260; rough ore, pounds sold, 2,020,970; zinc ore, pounds sold, 1,176,040; lead ore, pounds sold, 220,760. Sales aggregated a total value of \$21,662.

MICHIGAN.

Iron-Gogebic Range.

Iron Belt Mine.—The first real shipments since the close of the season of 1890 were made on Monday, last week. The force has been increased by the addition of about 300 men. The Iron Belt has about 100,000 tons in stock and the mine in every respect is in excellent shape for producing ore.

MISSOURI.

Jasper County.

Cartersville.—This prosperous mining camp met with a serious accident last week at the old Troup mines. The mine has been one of the large and steady producers of the district, and was operated at a depth of 200 ft. Large bodies of ore had been stoped out, leaving large open chambers, without any means of support for the roof. At some points 40 to 50 ft. above the floor, the heavy rains thoroughly soaked the surface of the ground, and the moisture worked its way down, when the roof gave way. Fortunately, the miners had noticed a slight crack in the surface of the ground, so that the men were all out when the first cave occurred. The surface of the ground cracked for some distance, and a man was engaged in filling the opening with tailings from the mill to stop the surface water from flowing in, and two other men were standing near when the ground gave way, covering all three. The same night the concentrating plant was burned down, involving a loss of over \$10,000. We understand that an effort will be made this week to recover the bodies. We trust that this cave-in will prove a warning to other large mines and that some effort will be made to properly secure some of the large openings.

Roaring Springs Land and Mining Company.—This company's property is located 3½ miles southwest of the city of Joplin, and is now coming to the front as a large and steady producer. The output for the past two weeks was 424,450 lbs. zinc ore and 36,960 lead. There are now 22 producing mines on the company's land, operated by leasers on the royalty plan. The company operates a large concentrating plant, and dresses the ore for the leasers. They also have a central power plant for operating the pumps at different points on the land, and have recently put in a system of transmitting power by manilla ropes. This is a great improvement over the old system of operating the pumps by the old time wooden string dragging over the ground. The entire works are under the management of Mr. E. Hedberg, M. E., who has made many improvements in the machinery, and is now drawing plans for increasing the crushing and rolls department of the concentrating plant.

(From our Special Correspondent.)

Joplin, May 30.

The weather of the past week was favorable for mining operations; in fact, it was the first week of pleasant weather for about six. The activity was general throughout the entire lead and zinc belt. Zinc ore was in good demand, and the market had an improved tendency, closing at an average of \$24.25 per ton. Lead ore remains unchanged at \$24.50 per thousand. Following are the sales of ore from the different camps: Joplin mines, 1,457,050 lbs. zinc ore and 287,300 lead, value \$24,523.45; Webb City mines, 398,110 lbs. zinc ore and 88,170 lead, value \$6,941.15; Cartersville mines, 1,734,180 lbs. zinc ore and 299,290 lead, value \$28,226.15; Zincite mines, 137,590 lbs. zinc ore and 4,590 lead, value \$1,850.35; Oronogo mines, 6,320 lbs. zinc ore and 39,580 lead, value \$1,013.20; Carthage mines, 353,890 lbs. zinc ore and 41,500 lead, value \$5,056; Galena mines, Kan., 1,176,040 lbs. zinc ore and 220,760 lead, value \$20,721; district's total value, \$88,331.30. Aurora, Lawrence County, mines, 185,000 lbs. zinc ore, 721,160 lbs. silicate and 230,000 lbs. lead, value \$12,057. Lead and zinc belts, value, \$100,388.30. The Empire Zinc Company are running their mines and smelter to their full capacity, and last week made a shipment of three carloads of spelter direct to Europe; this was to fill an order for 50 tons. A considerable effort has been made in this district during the past year and a half to open up a foreign market for the crude ores, and several thousand tons were exported, but it certainly seems more desirable to ship the metal than the ore; therefore, all the ore should be smelted here at home. There is an abundance of coal within a short distance of the mines; in fact, everything is favorable to the location of smelters at this point. The Richland Mining Company, of Cartersville, has filed articles of in-

corporation, with a capital stock of \$100,000. The property is located at Cartersville, and is a well developed and steady producing property. The American Mining Company, operating on 40 acres of the Rex M. & S. Co. land, has just closed a contract for the erection of a large concentrating plant. This property is owned and operated by Mr. F. M. Sharp and others, of Kansas City. The company has spent several months in development and exploration work, and now has a large amount of ore in sight ready to mine out as soon as the mill is completed.

MONTANA.

The Combination Mining and Milling Company.—This company will hold their regular annual meeting on the 27th of June, at the office of the company in Butte City, for the election of trustees, etc. The proposition of removing the office of the company from Butte to St. Louis, Mo., it is said, will come before the meeting. The Combination Company is probably in better condition at the present time financially than it has ever before experienced. The bullion shipments have been regular during the past few months, while it is said that the mine looks well.

Alice Mining Company.—Active preparations are being made for the starting up of the remaining 30 stamps in the Alice mill, and they will be dropping again within a week. The recent strike in the Alice is growing both in richness and size, and more men are being put to work on it almost daily. The Blue Wing has been shut down and the entire force transferred to the Alice. As soon as the other 30 stamps are started up the main force will be still further increased. Between 175 and 200 men are now on the Alice pay roll.

Moulton Mining Company.—The strike made in the Moulton recently faded away a few days ago, and the ore has gradually dwindled down to very low grade. This strike, however, has led to the belief that they are very close to the big and long-lost vein, and Superintendent Clark is still prospecting for it.

Deer Lodge County.

Champion Mining Company.—The mill, after several days' shut-down, occasioned by the almost impassable condition of the roads leading to the mine, resumed work recently and is now dropping its complement of stamps. The work of sinking to the 800 in the mine is again progressing favorably, recent trouble with the pump having been remedied. It is believed that level will have been reached and a cross-cut to the vein completed within the next 60 days. The result of this development will have great bearing on the future of the mine. The sale of Champion stock delinquent on the last assessment occurred in this city Saturday. About 8,000 shares were sold at an average price of a little over 9 cts.

Hope Mining Company.—Reports from Philipsburg are to the effect that the Hope Mining Company has a heap of trouble on its hands, and the assertion is made that it will result in tying the property up for an indefinite period within the next ten days. It is claimed that the Hope company has knowingly for a long time been extracting ore from property which it does not own. Some of this property has also become valuable for real estate, and a number of suits for hearing damages are said to be pending.

Bi-Metallic Extension Mining Company.—It is believed that this company has encountered the much coveted vein. During the past week, from the north cross-cut, the diamond drill penetrated two leads. One of them shows up well and has an assay value equal to the vein of the Bi-Metallic, of which it is believed to be an extension.

Jefferson County.

The Engineering and Mining Journal of April 19th stated that a suit has been brought by Reed, Van Wart and others against the Elkhorn Mining Company, but we are informed we have made a mistake as to what the suit is about. It should have been stated that the Elkhorn Mining Company purchased the J. R. Keene lode, which, being unpatented property, could not be owned by it, it being an alien company. The property was purchased and deeded to and recorded under the title of the purchasers, the Elkhorn Mining Company, and some of the parties who jumped the property were original owners. Neither is the Elkhorn Mining Company now extracting ore from the claim or ever has taken ore from this claim.

North Home.—This mine is what is known as a chimney deposit. The ore is a chloride. It does not differ much in appearance from the surrounding limestone, and only upon very close scrutiny may any signs of its richness be discovered. The present developments consist of a shaft about 100 ft. deep, from which over \$15,000 worth of ore has been extracted, and a drift at 50 ft., another at 100 ft, with stopes all in ore.

Rena.—This mine is developed by a vertical shaft 133 ft. deep, a drift of 40 ft., and an incline shaft of 35 ft., and another vertical shaft 50 ft. deep, all in ore.

Meagher County.

Horn Silver Mine.—The ore body recently opened up shows quartz mixed with different grades of silver and lead galena. For some time they have been troubled with porphyry dyke, but it now looks as if they were leaving that formation and coming into quartz full of galena.

Flansburg.—The lead has been reached and opened to the width of the tunnel. The tunnel will be con-

tinued in at least 100 ft. before cross-cutting will be commenced. The ore is free. The mine is in the Carpenter Creek district, close to the Whiporwill and other mines.

Missoula County.

Curlew.—This mine is now shipping considerable ore, in addition to that which is sent to the mill for concentration. The mill is kept running steadily and is treating 125 tons of ore daily. Most of the ore that is now being taken from the mine is coming from between the 300 and 400 ft. levels, and is equal in grade to any ever before taken from the mine. The vein pitches strongly to the east from the vertical shaft, and is at the bottom (400 ft.) level some 600 or 700 ft. from the shaft. It can be cut by a new shaft to the same level as the present one, with much less sinking than it took for the shaft now used, as the hill itself also slopes to the east. The economical working of the mine would seem to make the sinking of the new shaft a necessity of the near future.

Silver Bow County.

A lead has been struck in excavating for the new hotel building in East Broadway, on the site of the old St. Nicholas Hotel. In digging under the sidewalk directly opposite the City Hall, a silver vein 15 ft. wide was struck.

Anaconda Mining Company.—At the time of the accident at the Anaconda mine a force of men was engaged in developing the shaft on that property. During the work of recovering the bodies work was suspended in all parts of the mine. The work of development on the shaft has been resumed and will be continued until the 1,500-ft. level is reached. Work on all the other levels has also been resumed.

Boston and Montana Consolidated Copper and Silver Mining Company.—Mr. Frank Klepetko, superintendent of the Great Falls works of this company, informs that contrary to the statement in our issue of May 14th, he did not try Sand Coulee lump for gas making. The nut, however, was tried, but was a failure, which is not attributed to the fault of the coal as much as to the men, who are not used to working with coal so high in ash. The Lethbridge coal was not found to be useless for gas-making. On the contrary, it was one of the best gas producers tried. The reason for adopting Sand Coulee slack was that not only was it a good gas producer, but it was extremely cheap.

Eveline.—Another very rich streak of ore was found in the west workings of this mine a few days ago. When first sighted it was supposed to be a portion of the foot-wall, as a clay seam separated it from another rich streak found about two weeks ago.

Stella.—The 14-ft. ledge silver ore at the Stella mine is being worked, about 30 men being employed. It is said this property is netting \$1,000 a day for the leasers.

NEVADA.

Elko County.

Belle Isle Mining Company, official.—West cross-cut, 250-ft. level, extended 7 ft. North drift, same level, extended 7 ft. North drift, 350-ft. level, extended 4 ft.

Grand Prize Mining Company, official.—Concentrator running on Nevada Queen ore; crushed 473 tons and 100 tons combination during the week; now running all Nevada Queen.

Nevada Queen Mining Company, official.—Second level: East intermediate from No. 1 chute, stopes have been started. West intermediate drift has been run 12 ft., in ore. South side of drift is all first-class; will average about \$200 per ton; on north side 1½ ft. of first-class, balance second class. Stopes started 15 ft. from the chute (No. 1), have broken into the ore, from the footwall up—14 ft.—no hanging wall as yet. The ore extracted is one-fourth first-class, average assay \$190 per ton, the balance second-class, average assay from battery \$29.72 per ton. East intermediate stopes from No. 2 chute have 2 ft. \$185 per ton; west stopes from same chute the ore is over 4 ft. average \$220 per ton. East intermediate from No. 3 chute advanced 16 ft.; south from same 15 ft., and west 5 ft., connecting with No. 5 chute. From No. 5 have run 12 ft. toward No. 6, and east from No. 6, 5 ft.; 1 ft. of first-class ore in both drifts. No. 7 and No. 6 chutes have been connected, exposing ore all through. South drift on west vein has been run 15 ft., exposing 1 ft. of ore, assaying \$250 per ton. North drift extended 9 ft., 1 ft. of fair grade ore. Stopes between the south and north drifts are looking well. No. 1 winze from south drift is down 20 ft., exposed 1½ ft. of first-class ore, but not looking so well in the bottom. The above openings have produced for the week 117 cars of ore, average assay battery \$269.80 per ton, and 610 cars second-class, average assay from concentrator \$29.72 per ton. Third level: South intermediate drift from chute No. 3 has been run 16 ft., following ore 2 ft. wide; produced 4 cars ore, average assay \$375 per ton, 8 cars second-class, assay value \$45 per ton. Have received from Union Mill Company on account of ore \$30,000.

North Belle Isle Mining Company, official.—South intermediate drift above the north 500 extended 6 ft., showing good ore in fair quantity. The various stopes are looking better than at last report.

Union Milling Company.—Mill running; crushed 164½ tons Nevada Queen ore for the week.

Storey County—Comstock Lode.

Hale & Norcross Mining Company.—Superintendent Ryan, of the Hale & Norcross, inaugurated an entirely new departure in the working of the mine, which may be followed by results of not only great benefit to stockholders, but Comstock mining interests in general. The departure consisted in the beginning of repairs to the incline below the 1,640, or Sutro tunnel level, with a view to opening it up to the 1,800 level and the establishment of mining in that part of the mine. In the original sinking of the incline years ago the haste to reach the lower levels prevented the prospecting of the mine at all between the 1,700 and 1,900 levels. This is the first resumption of mining below the 1,640 level, or the Sutro tunnel, since the combination closed down and deep mining ceased in 1886. Between the 1,600 and 1,700 levels the mine has only been partially prospected, and there is room for large developments in that neighborhood. It is also known that there was ore on the 1,900 when work was stopped there. If this departure should prove successful, and profitable ore developments be made, the sentiment favoring the resumption of mining in the lower levels all along the lode will receive an impetus which may be followed by great and lasting results.

(From our Special Correspondent.)

The following is the weekly statement of ore hoisted from Comstock mines and milled, with the car sample and battery assays, etc. It will be noted that this week the directors of the Consolidated California & Virginia and Savage companies are permitting the respective mine superintendents to make known the car sample assay value of the ore extracted, and also particulars as to bullion shipped and on hand.

Mine.	Tons hoisted.	Car Sample assay.	Tons milled.	Average bat. assay.	Bullion for the week.	Bullion shipped.	Bullion retained on hand.
Con., Cal. & Va.	1,064	29.57	98	26.00	....	14,830.90	14.50
Hale & Norcross	525	21.58	429	14.81	....	7,547.36	....
Ophir	20	21.70	....	....	....	....	....
Overman	89	22.74	235	20.33	....	....	....
Potosi	351	....	80	22.18	....	....	....
Savage	525	27.66	525	20.56	7,591.50	....	....
Yellow Jacket	126	....	....	....	....	....	....

Total to date on May account..... \$34,740.06

* Cars.

Belcher Mining Company, official.—We are still following the pay streak in the 300 level, both on the track floor and on the second floor from the raise, with no material change to report from there for the week.

Imperial Mining Company, official.—We are taking out some fine ore from the old fillings and small streaks on the upper levels.

Savage Mining Company, official.—During the week we have hoisted 605 cars of ore from the 950, 1,400 and 1,450 levels; shipped to the Nevada mill 525 tons; milled 525 tons; average car sample assay, \$27.86; average battery assay, \$20.56. Bullion yield for the week, \$7,591.50. On the 500, 750, 1,100, 1,400 and 1,450 levels we are doing considerable prospecting.

White Pine County.

Oseola Gravel Mining Company.—Fifty men are now at work on the different claims of this company, and there is every prospect of a long run.

NEW MEXICO.

The exploring party under General Cook, now in the Carrizo Mountains, is followed by a large number of prospectors, who will be the first to take advantage of any new discoveries. There is a probability that there will be another rush similar to the Oklahoma craze a few months ago.

The Mineral Point Zinc Company is shipping two carloads of ore a week from the mines at Hanover, but most of the ore in sight has been taken out, and unless new bodies are discovered future shipments will be light.

Grant County.

Cook's Peak Mining Company.—The statement in a former issue of the Engineering and Mining Journal that dividend No. 4 was one of 50 cts. a share was erroneous. It was 5 cts., as is No. 5, payable June 10th.

Standard Mining and Milling Company.—Superintendent Kemp recently commenced work on the building of a reverberatory furnace to be used in connection with the copper matte furnace nearly completed. The new furnace will be built of brick, and together with the smokestack will require about 60,000 brick. The heavy castings required are ordered and will be delivered here in time for building.

Santa Fe County.

Santa Fe Copper Company.—The Boston "Herald" has the following concerning this company: "The position of the affairs of the company appears to be like this: A few people in the management undertook to demonstrate whether there was anything to the property. They profess belief that the mines can be

worked to advantage if worked upon a scale sufficiently broad. Capt. John Daniell, of the Tamarack group, advises in harmony with their own experience. To be made profitable more machinery and more extended operations are required. The company is now able to treat about 40 tons a day. It ought to treat 100 tons, and \$100,000 is wanted to establish the works upon a broad scale. The operations to date have shown that the rock is fairly rich in precious metals with a good percentage of copper. The last return of ore treated by the electrolytic process gave the company some \$10,000 in gold and silver. The company sold 300,000 lbs. of electrolytic metal on the 28th ult.

PENNSYLVANIA.

Coal.

A dispatch from Pottsville says that the miners of the Schuylkill coal region have been granted an increase of 1% in the rate of wages. With a few exceptions all of the best producing collieries of the Reading company are now working, some four days a week and some full time.

The Schuylkill Coal Exchange has issued a report dated Pottsville, May 28th, which shows that the collieries drawn to return prices of coal sold in month of May, 1892, to determine the rate of wages to be paid, make returns as follows: P. & R. C. & I. Co., Ellangowan Colliery, \$2.29; Indian Ridge Colliery, \$2.32; Girard Colliery, \$2.34; Maple Hill Colliery, \$2.41; Wm. Penn Coal Co., Wm. Penn Colliery, \$2.17. The average of these rates is \$2.30. The average of these prices being \$2.30, the rate of wages to be paid for work for last two weeks of May, and first two weeks of June, 1892, is 6% below the \$2.50 basis.

Mine Inspector Patrick Blewitt, of the 1st anthracite district, has prepared and forwarded to the Secretary of Internal Affairs his annual report for the year 1891. It shows, among other things, a gratifying increase in the activity and productiveness of the mines of the 1st anthracite district. In 1890, the average working time in 68 breakers was 197.51 days; in 1891, that average, as gathered from 174 out of the 100 mines in the district, rose to 220.7 days, an increase of 23.19 days. During the year there was also an increase of 1,049,120.93 tons in the total output. Inspector Blewitt reports the general condition of the mines to be good, and the ventilation safe. The total production for the year was 9,981,356.00 tons, against 8,932,235.07 tons in 1890, an increase of 1,049,120.93 tons. Number of mines, 100; average working time in days for 74 breakers, 220.7; number of miners employed, 6,293; number of mine laborers, 5,087; number of other persons, 4,891; total number of employed in mines, 16,271. Number of persons working outside the collieries, 7,620; total number of employees, 23,891. Number of tons of coal produced in 1890, 8,932,235.07; number of tons of coal produced in 1891, 9,981,356; increased production 1891 (tons), 1,049,120.93. Number of tons of coal shipped 1890, 8,192,908.10; number of tons of coal shipped 1891, 9,137,872.12; increased shipments 1891 (tons), 944,964.02. Number of tons of coal consumed at the mines, 1890, 523,827; number of tons of coal consumed at the mines, 1891, 544,831.10; increase in consumption at the mines 1891 (tons) 21,004.10. Number of tons sold for local consumption, 1890, 215,499.17; number of tons sold for local consumption, 1891, 248,651.18; increase in local consumption, 33,152.01. Average number of tons produced by each miner, 1,586.28; average number of tons produced by each miner and mine laborer, 877.16; average number of tons produced by each of all the employees in mines, 607.37; average number of tons produced by each of all the employees at collieries, 417.83. Number of fatal accidents in 1891, 69; number of tons produced for each fatal accident, 144,657; number of persons employed for each fatal accident, 346; number of non-fatal accidents, 1891, 346; number of tons produced for each non-fatal accident, 461,425; number of widows from accidents in collieries, 29; number of tons produced for each widow, 344,185; number of children and orphans from accidents, 92; number of coal in mines and to the breakers. There were 320,134 kegs of powder used in mining 9,981,356 tons of coal in 1891, or 31.13 tons mined for each keg of powder used. Number of horses and mules employed in the mines, 2,676; number of mine locomotives, 42, with a horse power of 2,286, making a total horse power of 4,962 for transportation of coal in mines and to the breakers. There were 976 steam boilers to supply steam for 444 hoisting, fan and breaker engines, which have a horse power of 74,558; also 313 pumping engines with a total horse power of 11,362. There were 74 breakers having capacity of preparing and cleaning 58,530 tons of coal per day for shipment to market, and four chute buildings for cleaning, separating and dividing the coal into the various sizes. There were 75 fans and 14 furnaces for purposes of ventilation and four naturally ventilated mines, where pillars are being drawn back.

Philadelphia & Reading Coal and Iron Company.—According to a dispatch from Minersville, a large basin of red ash coal of unknown extent has been struck at Otto Colliery, near there, operated by this company. "Preparations will be made at once to develop it, as it is of fine quality and all above water level. The fact that there will be no water or gas to contend with will increase the output. The colliery now produces about 300 cars a day and employs over 500 men and boys."

West End Coal Company, Moccanaqua.—A gas explosion occurred on the 31st ult. at this company's colliery which resulted in the death of the foreman and two miners. The mine workings are reported to have been badly wrecked.

Oil.

The report of the Pennsylvania field for May shows a total of 183 wells completed, with 46 dry, and a production of 7,795 bbls. This is an increase of 15 wells, 13 dry holes and 934 bbls. of production over the figures for April. The new work at the close of May consists of 234 drilling wells and 107 rigs, a net increase of 11. In the Buckeye field there were 93 wells completed, with a production of 4,750 bbls. and 10 dry holes. This is a decrease of two in finished wells, an increase of 90 bbls. in new production, and a decrease of three in dry holes. The new work at the end of May consists of 64 drilling wells and 113 rigs, a net increase of 14. The Indiana field completed 17 wells, with a production of 505 bbls. and three dry holes. It is an increase of three completed wells, 189 bbls. new production, and one dry hole. The new work at the end of May consists of 13 drilling wells and 17 rigs, a net decrease of four.

SOUTH DAKOTA.

Harney Peak Tin Mining Company.—Two steam pumps arrived Wednesday for the Harney Peak company. They are of the Knowles pattern, double cylinder, direct acting. The discharge pipe of the smaller one has a diameter of 6 ins., the larger 7 ins. The two pumps complete weigh 20,000 lbs. The smaller one was taken to the Cowboy mine yesterday.

UTAH.

Beaver County.

Horn Silver Mining Company.—The following is the statement for the three months ending March 31st, 1892: Jan. 1st., balance, per last quarterly report, \$275,304.28. Receipts: Sales of ore, January, \$22,848.85; February, \$19,900.43; March, \$54,568.38; royalty on cave ore, \$1,510.42. Total, \$98,837.08. Interest account: United States Trust Company, \$3,150; sundry amounts, \$836.34; total, \$3,986.34. Store at Frisco: Surplus funds, \$1,507.54. Smelter at Franklyn: House rents, \$122. Total receipts, \$379,757.24. Disbursements—Mining: Labor, supplies, timbering, and dead work, \$45,795.31. General expenses: Salaries and clerk-hire, Frisco and Salt Lake City, \$2,396.11. New York office: Salaries and clerk-hire, \$3,050; general and office expenses, \$181.35; taxes, \$116.44; printing and stationery, \$107.10; rent, \$100; 200. Balance cash on hand: United States Trust Company, \$210,000; First National Bank, \$65,085.52; Deseret National Bank, \$2,919.54; petty cash, \$5.87; total, \$278,010.93. Total disbursements, \$379,757.24.

Juab County.

Last Chance.—The shaft is now down 75 ft., and is being timbered and put in shape for a 20-H.P. steam hoist. It is the intention of the owners to sink 300 or 400 ft. and then cross-cut, which will place another producer on Tintic's list of shippers.

Mammoth Mining Company, Tintic.—The mine is looking well. A large body of ore was recently struck in a drift run from the 900-ft. level. The same body has recently been struck on the 1,000-ft. level. The ore has increased there both as to quality and quantity. The main shaft is being sunk deeper, and it is expected that it will reach the 1,100-ft. level, and the station will be cut out by the 15th of June.

About 100 men were laid off at the Mammoth last Friday and Saturday. No reason is known, but the low price of silver is supposed to be the cause.

Salt Lake County.

Lady Godiva.—There is a large amount of ore on the dump ready for shipment. The tunnel is in a distance of 700 or 800 ft., and they are now working in large bodies of ore. Considerable drifting and stoping has been done, and the mine is now in first-class condition for being worked.

Yosemite No. 2 Mining Company.—A new strike in the Yosemite No. 2 has developed a 3-ft. ore body, carrying from 55 to 60% lead and 50 to 60 oz. silver.

Summit County.

Park Mining Company.—The claims owned by this company have been sold to David Keith and associates. The price paid was 20 cts. per share for the stock of the concern, or \$30,000, there being 150,000 shares of stock. The ground purchased adjoins the Silver King on two sides and conflicts with it, and the purchase was made to obviate any and all litigation that might arise from the working of the Silver King, which is proving a rich mine. Besides, the continuation of the vein which is yielding in the Silver King and May Flower is undoubtedly in the ground purchased, hence the buy is a good one.

WASHINGTON.

The development of the State of Washington will be assisted materially in the near future by the work of the United States Geological Survey. Prof. J. S. Diller, the geologist of the Cascade division—which includes Washington, Oregon, and California above the fortieth parallel—has already made a preliminary survey, and put one party of men at work under Prof. Israel C. Russell in eastern Washington. During the last few years Professor Russell has been studying the glaciers on Mount St. Elias; before that he was engaged for some time on the remains of the

great lake which once covered a large part of Nevada. His task here is somewhat the same, for he is studying the beds of a huge lake which once stretched from the Cascade Mountains to the mountains of Idaho and through Washington down into California. This lake existed in the middle tertiary period, when the mountains were much lower than now, and the space between was a level plain. Vegetation was luxuriant, and animals were abundant, as is shown by the fossil remains. The fact that these fossils are more plentiful in Oregon and California than in Washington indicates that the northern end of the lake was the first to disappear, the animals following the retreating bed south. In succeeding ages convulsions of nature raised the mountains still higher, crumpled the plain of eastern Washington into valleys, and probably tore the chasm in the Cascades by which part of the waters of the lake were poured out into the sea. Through this gorge the Columbia River now runs. The extreme fertility of the soil of eastern Washington is partly due to the fact that much of it is the sediment of this lost lake. In the wheat fields of Palouse County, for example, the loam is 60 ft. deep. Though there is an arid belt in eastern Washington, the land there is wonderfully productive when irrigated. Some of it is already well watered by ditches from the streams, and within the last year artesian wells have been successfully driven on plains above the reach of the streams. When Prof. Russell has determined the beds of the old lake, he will have done much toward solving the irrigation problems of the eastern half of the State; for he will then be able to tell very closely the sources of artesian water supply and the lands which can be irrigated by this method. Every acre added to the irrigated tract means twenty-five more bushels of wheat, or a corresponding amount of other grain or of fruit, added to the State's product. So the importance of Prof. Russell's work in developing the agricultural resources of Washington can hardly be overestimated. In western Washington the first work will be done in the vicinity of this city, which is in the center of the coal region. A careful study of the coal measures will be made. The country west of the Cascade Mountains, and perhaps much that is east of them, was raised above the surface of the ocean and lowered again a number of times. The vegetation which formed on the land turned into coal after submersion, and one geologist has made the statement that there are 14 of these layers of coal. The veins, however, are much twisted and folded, so that faults are common. Consequently the mining companies have spent much money in hunting for veins after the coal has been lost at one of these faults. The geological survey will endeavor to find out the general lines of fracture and folding, and thus formulate a rule—accurate enough for ordinary working—by which the coal may be found again after a fault has been reached. With this aid from the Government the mining companies hope to lessen the cost of production, materially enlarge their market and increase the output.

WEST VIRGINIA.
Pendleton County.

It is reported that a copper mine in this county, near the state line, recently passed into the hands of J. C. Boggs, of Monterey. The ore is said to be of excellent quality, and Mr. Boggs is getting Northern capitalists interested in its development.

FOREIGN MINING NEWS.
AUSTRALIA.

Broken Hill Proprietary Company.—Mr. W. R. Wilson, chairman of this company, made a statement to a meeting of shareholders recently. He said it was intended to purchase the British smelters at Port Pirie, and erect six more there. McGregor's Hill would be removed to a depth of 70 ft. to 80 ft., by which £40,000 worth of timber would be recovered and 400,000 tons of ore opened up. The drop in the price of silver and the want of water made it possible that they would have to omit a dividend, which he considered preferable to a reduction in the amount. Mr. Uren will replace Mr. Harper as mining manager. The present state of the mine and yields were most satisfactory. A motion was carried unanimously that the directors be requested, failing the carrying out of Stockdale's scheme, to take immediate steps to get water from the River Darling. As a result of the statement and the probability of the passing of a dividend the shares fell after the meeting from £6 5s. to £5 13s. 6d.

BOHEMIA.

An appalling accident occurred at the famous Birkenberg silver mine, near Pribram, in Bohemia. The timbers used in supporting the roof of the mine and for other purposes caught fire and the flames spread rapidly from one part of the workings to another until the whole interior of the mine was a mass of fire. Of the 500 men working in the mine, 200 are missing and are believed to be dead. After a long struggle the fire was extinguished and volunteers went down into the mine to rescue any one who might have lived through the fire. The galleries were found to be badly obstructed with the charred timbers, and much difficulty was found in making progress in any direction from the shaft. The rescuing party found no trace of life, but they discovered 14 bodies, which were sent to the surface. The work of rescue was suspended during the night owing to the suffocating gases with which the mine was

filled, and was resumed at an early hour next morning. At last accounts 87 bodies had been recovered from the mine, and 25 of the miners were rescued in a very precarious condition, being shockingly burned and crushed. Most of the victims, including three men who lost their lives while engaged in the work of rescue, died of suffocation, being overcome by the fatal gases which pervaded the entire mine. The fire began in the Maria shaft. Speaking tubes connect the surface with the various galleries. When the fire was discovered no response could be obtained from the tubes, but later voices came from the gallery next to the burning level. A dense smoke, which killed four men using the water hose, they falling to a great depth among the flames and smoke, soon prevented further attempts to rescue the imprisoned miners. The smoke must have by this time penetrated all the galleries, and it is feared that none of the entombed men will escape. The mines belong to the state, and have been worked since the year 1330. They are the deepest in the world. A description by a special correspondent of these mines and works will be found on another page.

Prague, June 3.—It is now believed that at least 400 lives were lost in the fire in the Pribram silver mine. A hundred bodies only have been recovered, and the rest are hard to get at, as the mine is now full of gas, which threatens disaster to the searchers at any moment. It is believed that all the bodies will not have been recovered for at least a fortnight.

CHINA.

Tonquin.

Lieut. P. Balagny, an officer of the French army, is authority for the statement that the most important enterprise and the one promising the richest results to his government in Tonquin is mining. Development work is being rapidly pushed and is giving employment to large numbers of the natives. During the last year no less than 18 antimony mines have been opened, but so far the work has been simply of a preliminary nature. The coal mines, however, are yielding a very considerable output, a market for which is found at Hong Kong. Silver and gold is also found in workable quantities, but in locations so inaccessible that they cannot be readily mined. For the most part the mines being operated are under the control of English and French capitalists, but recently Americans have been obtaining mining interests, and the outlook for the present year is more favorable than ever before.

MEXICO.

Chihuahua.

Don Enrique Mining Company.—At the annual meeting of this company in New York the following directors were elected: G. C. Magoun, G. F. Crane, C. T. Barney, Walker Lambert, B. P. Cheney, J. C. Fargo, J. R. Robinson, D. Newton Barney and P. E. Peabody. This property, situated at Cusihiuriachic, has been worked only in a limited way for the past five years. The mill and hoisting works on the property were destroyed by fire in March, 1890, but it is reported, will be rebuilt. The ores of this mine averaged between 40 and 50 oz. of silver, the gold being infinitesimal, but were refractory, and as a whole the company, while producing a considerable amount of bullion, did not earn a profit.

Puebla.

In this state a deposit of hematite iron ore has been found. The importance of the discovery is heightened by the fact that within four miles of this iron bed excellent bituminous coal has been discovered.

SOUTH AFRICA.
Witwatersrand.

The gold output of the Witwatersrand District continues to increase, the production for the month of March amounting to 93,244 oz. against 86,649 oz. in February and 84,560 oz. in January, or a total for the first quarter of 264,453 oz. of a total value of \$4,527,927. The output for the corresponding quarter of 1891 was for January, 53,205; February, 50,073, and March, 52,944, a total of 156,222 oz. The average yield per ton of ore crushed was 0.637 oz. During the month 1,755 stamps were in operation, averaging a run of 27.23 days each, 3.14 tons being crushed per stamp per 24 hours. The highest value produced per stamp per calendar day was £16 19s. 3d., the average per stamp £5 0s. 9d.

CHEMICALS AND MINERALS.

New York, Friday Evening, June 3.

Heavy Chemicals.—Trade has been very quiet this week in the market of heavy chemicals. Generally speaking, there has been no change either as to price or as to the nature of the business done. Sales have been light in almost all the instances, and the demand is far from being accurate. By our Liverpool report it will be seen that a similar condition rules on the other side. Quotations are as follows: Caustic soda, 70 per cent., 2.95@3.10c.; 74%, 2.97½@3.12½c.; 78%, 3.12½@3.25c.; 77%, 3.12½@3.25c. Carbonated soda ash, 48%, 1.55@1.60c.; 58%, 1.47½@1.52½c. Alkali, 48%, 1.55@1.60c.; 58%, 1.47½@1.52½c. Sal soda, English, 1.05@1.10c. Bleaching powder, 2.15@2.20c. on the spot, according to quantity.

Acids.—A good business has been done in this market, and the demand, which last week showed a tendency to slack off, has improved again. The majority of the manufacturers report a busy time at the factories. Prices are firm, but show no sign of an advance. We continue to quote: Acid per

100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.60@2 according to quality; muriatic, 18°, \$1; 20°, \$1.12½@1.25; 22°, \$1.25; nitric, 40°, \$4; 42°, \$4.50@4.75; sulphuric, 90c.@1.10; mixed acids, according to mixture: oxalic, \$7.25@7.75. Blue vitriol is quoted all the way from \$3.25@3.50; alum, lump or ground, \$1.55@1.80. Glycerine for nitro-glycerine, 11½@12½c., according to quality and quantity.

Brimstone.—The market for Sicilian brimstone is quiet, with prices practically as last reported. Best unmixed seconds on the spot are \$24. No thirds on the spot are offering. Future shipments are held at \$23.50@23.75 for best unmixed seconds and \$23 for thirds. Some sales have been made at the above figures.

Fertilizers.—A very quiet week has passed this market, which is natural considering the time of the year. The ammoniates are slightly weaker, and there has been a decline in prices. We quote this week: Sulphate of ammonia, \$2.85 for bone goods and \$2.90 for gas liquor. Dried blood, \$1.90 per unit for high grade and \$1.80 for low grade. Acidulated fish scrap, \$11@12, factory. Dried scrap, \$21.50. Azotine, \$1.90@1.95. Tankage, \$17.50@21, according to grade. Bone meal, \$22.50@23.50.

Double Manure Salts.—Quotations are as follows from lots of from 10 to 50 tons ex-vessel New York 48-53%, \$1.13½@1.23½; 90-95%, \$2.13@2.23½.

Kainit.—Sales for kainit for the past week aggregate about 3,300 tons. Inquiries from the South continue to be received, and probably will result in a fair business. Prices remain \$8.75 for invoice weight and \$9 for actual weight, New York and Philadelphia.

Muriate of Potash.—There is nothing new to report of muriate, which continues quiet and unchanged as to price. Arrivals of late have been fairly heavy, but as they were mostly contracted for they have not effected the market.

Phosphates.—A dull and an uninteresting market is reported. Prices at Charleston, S. C., continue nominally as follows: \$5 for dried and \$4 for undried free alongside.

Nitrate of Soda.—This market has been very dull, with stocks accumulating. Quotations are practically as last reported: \$1.63½ for spot, and \$1.65 to arrive. Messrs. Mortimer & Wisner, the well known nitrate brokers, issue the following monthly statement:

	1892.	1891.	1890.	1889.
	Bags.	Bags.	Bags.	Bags.
Imported into Atlantic ports from West Coast S. A. from Jan. 1, 1892, to date.....	322,520	286,391	290,154	214,401
Imported into Atlantic ports from Europe.....		18,802		
	322,520	305,193	290,154	214,401
Stock in store and afloat June 1, 1892, in New York.....	81,443	67,045	30,923	57,763
in Boston.....	600	3,000		
in Philadelphia.....				
in Baltimore.....	4,000	5,300	6,000	18,695
To arrive, actually sailed.....	170,000	192,000		
Visible supply to Sept. 1, 1892.....	256,053	267,345		
Additional charters.....	148,000	153,000	527,900	308,900
Total supply, when shipped.....	404,043	420,345	568,823	385,158
Stock on hand, Jan. 1, 1892.....	53,585	36,454	22,009	87,043
Deliveries past month.....	57,457	13,170	49,760	55,880
Deliveries since Jan. 1 to date.....	290,062	266,302	274,640	225,186
Total yearly deliveries.....		634,207	673,679	546,589
Prices current June 1, 1892.....	1'62½	2'07½@2'10c.	1'70c.	1'95@2c.

NOTES OF THE WEEK.

The Empire State Phosphate Company, of Inverness, Fla., has entered suit against Messrs. Heller, Hirsch & Co., of New York, for \$100,000 damages, for refusing to take the phosphate of the above company as per contract.

Liverpool.

May 25.

(Special Report by Joseph P. Brunner & Co.)

Our market for heavy chemicals shows little change since our last report, the demand being still disappointing, while the only change to report in quotations is a decline of 5s. per ton in caustic soda. The colliers' strike in the Durham district is not yet settled, the men having offered to go in on a reduction of 10%, while the masters decline to take them on except at a reduction of 13½%, but the men have refused the masters' terms, and no compromise has yet been arrived at.

Soda Ash.—The "Union" will not quote for earlier delivery than July, for which the nominal quotations for the commoner qualities are as follows: Caustic ash, 48%, £5 6s. 3d. per ton; 57@58%, £6 7s. 6d. per ton; carb. ash, 48%, £5 9s. 9d. per ton; 58%, £6 12s. 9d. per ton; ammonia ash, 58%, £6 7s. 6d. per ton, all net cash. For prime brands a considerable premium on above figures is demanded.

Soda Crystals are moving off at £3 7s. 6d. to £3 10s. per ton, less 5%.

Caustic Soda.—The "Union," finding that they had lost a considerable amount of business owing to foreign competition, have reduced the price 5s. per ton all round. This concession has had practically no effect on the market, and the demand is still of a retail character. The spot quotations are now as follows: 60% £9 2s. 6d. per ton; 70%, £10 5s. per ton; 74%, £11 5s. per ton; 76%, £12 5s. @ £12 10s. per ton, all net cash. For parcels under 10 tons 5s. per ton extra is charged. Shipment to the United States is "barred" by the "Union."

Bleaching powder steady at £7 15s. @ £8 per ton net cash for hardwood packages, for all quarters except United States and Canada.

Chlorate of potash dull and nominally 6% @ 7d. per pound for prompt and June delivery, and about 6 1/2 d. for July-December. It is reported that the syndicate has declined a bid of 6 1/2 d. for August-December delivery, but had the bid been made to resellers it might possibly have been accepted.

Sulphate of ammonia is quiet, rather lower figures have been accepted in some cases. The nearest spot quotations are £10 2s. 6d. @ £10 5s. per ton for good grey 24%, and £10 5s. @ £10 7s. 6d. per ton for 25%, both in double bags, less 2 1/4% f. o. b. here. At the same time some makers are showing rather more firmness, and decline to accept the present low figures, preferring to look on for a little rather than sell at a sacrifice.

(From Geo. G. Blackwell's Weekly Report.)

Minerals.—The firmness reported in our market last week has been well maintained. Manganese: Arrivals still small; stocks have been further reduced, and prices remain firm. Borate at 6 1/2 d. per lb.; sulphate, £21 10s.; oxalate, 1s. 6d. per lb.; chloride, £15; carbonate, £12 10s., steady. Magnesite: Raw lump continues quiet; raw ground, £6 10s., and calcined, £12 10s. Bauxite (Irish Hill brand), in brisk demand; lump, 20s.; seconds, 16s., and thirds, 12s. French chalk: There are fewer arrivals to report this week; prices continue to rule steady, especially for "Angel White" brand and "Silvery," 90 @ 92s. 6d.; prime quality, 90 @ 95s.; and superfine, 105s. Barytes: Carbonate continues scarce, especially best lump, at 90 @ 95s.; nuts, 70 @ 80s.; while finest white sulphate is steady. "Angel White," No. 1, 70s.; No. 2, 66 @ 65s.; No. 3, 45s. Pumice stone easier. Iron ore steady; Bilbao shipments unaltered; Irish and Cumberland easy. Santander and manganiferous, there is more doing. Emery-stone: Best brands inquired for at full prices; No. 1, lump, £5 10s @ £6, smalls, £5 @ £5 10s. Fuller's earth quiet; best lump, 55s, fine impalpable ground, £7; "Emerald" ground, 80s. Scheelite, wolfram, tungstate of soda, and tungsten metal continue firm and unaltered. Chrome ore firmer, especially for higher grades. Antimony ore and metal easy. Asbestos very firm. Potter's lead ore, smalls, £10 10s. @ £11 10s. Calamine easy. Strontia sulphate (celestine) quiet. Limespar unchanged, especially for English manufactured; old G.G.B. brand in demand at 50s. (ground). Felspar quiet. Fluorspar: Best quality scarce. Ferro-manganese steady, 75%, £12; 85% £13 15s. Plumbago brisk. Spanish, £5; best Ceylon lump at last quotations; Italian and Bohemian, £4 @ £12 per ton. "Founders," £5 @ £6; Blackwell's "Mineraline," £10. French sand, 20s. @ 22s. 6d. Ground mica, £45 @ £50. China clay steady; common, 18s. 6d.; good medium, 22s. 6d. @ 25s.; best, 30s. @ 35s. (at Runcorn). Irish moss; Little doing; prices higher. Bog ore (oxide of iron) steady; finest quality 2s. @ 23s.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Deadwood, Dak., Pittsburg, St. Louis, London and Paris, see pages 608 and 610.]

New York, Friday Evening, June 3, 1892. It is the old story of masterly inactivity in the mining market. The dullness of the past six months continues unabated and absolutely nothing of interest can be reported this week.

With one or two exceptions the Comstock stocks have been quite neglected. According to certain San Francisco reports, this is due to the desire on the part of the "magnates" to counteract the effect produced by the decision in the Hale & Norcross suit. It is alleged that the "insiders" are purposely bearing stocks, and to anyone who is familiar with their methods this will not seem improbable. During the past week there were sales of 170 shares of Consolidated California & Virginia at \$4.50; at the close, however, the bidding price was at least 50 cents below this figure.

Of Comstock Tunnel stock 4,830 shares changed hands at 12 @ 14c. Of the "scrip" there were sales of 20 at 14c. A \$1,000-bond was also sold at 18%. There was a solitary sale of 100 shares of Hale & Norcross at \$1.55. Among other sales there were: 200 shares of Bullion at \$1; 300 shares of Julia at 15c.; 100 shares of Mexican at \$2.05, and 400 shares of Scorpion at 20c.

Of the California stocks there were sales of 400 shares of Bodie Consolidated at 37 @ 40c.; 200 shares of Plymouth at 90 @ 92c.; 100 shares of Standard Consolidated at \$1.35; 2,000 shares of Belmont at 34 @ 36c., and 4,600 shares of Brunswick Consolidated at 17 @ 18c.

Of the Colorado stocks there were sales of 100 shares of Chrysolite at 15c. and 400 shares of Leadville Consolidated at 15 @ 16c. Of Little Chief 2,000 shares are reported to have changed hands at 25 @ 27c. Silver Cord this week shows a transaction of 1,000 shares at 30c. In our mining news column

will be found news of interest concerning this property.

Of the Black Hills stocks there were sales of 100 shares of Caledonia at 84c. and 100 shares of Father de Smet at 45c. Of Deadwood Terra 300 shares were sold at \$2.10 @ \$2.15, and of Homestake 50 shares at \$14 @ \$14.50. Sullivan Consolidated shows sales of 600 shares this week at 53 @ 54c.

For the first time in months Santa Fe copper was dealt in, 500 shares being sold at 20c.

Silver King, which has been neglected of late, shows a sale this week of 300 shares at 34c.

Boston. June 2.

(From our Special Correspondent.)

The improvement noted in the copper stocks by our report of last week did not hold and prices declined to very nearly the same figures quoted for several weeks past. There does not seem to be any disposition on the part of the public to speculate in this class of stocks and transactions are largely made by room traders who make the market for the time being to suit themselves. There are always more or less orders to buy investment stocks, such as Calumet & Hecla and Tamarack, but the principal trading is in the Montana mines and they lead the market. Last week Boston & Montana sold up to 46 1/2 and opened this week at 45 1/2 and gradually declined until to-day it touched \$44. On the other hand Butte & Boston advanced on small transactions from 12 1/2 @ 13 1/2 and held the advance. Calumet & Hecla sold at \$270 all the sales being at that figure. About 50 shares of Tamarack sold at \$166.

Osceola was comparatively steady and strong in the early part of the week at \$33 1/2, but lost all the advance and closed at \$32 1/2.

Kearsarge sold at \$13, same as last week, with a small lot 1/4 higher.

Centennial advanced 1/2 to 1 1/2 but lost the fraction in later dealings. Atlantic declined from 11 1/2 to 10 3/4.

There were no sales of Franklin reported for the week. Santa Fe sold early at 20c. but declined on free offerings of the stock to 17 1/2 c. There is some talk of a reorganization of the company, or an assessment on the stock to put it upon a paying basis.

Wolverine sold at \$2; Bonanza at 40c., and Humbolt at 30c. The stock of the Tamarack, Jr., has been placed upon the list of the Exchange, and it will now be possible to obtain reliable quotations. Quincy has not as yet been reinstated. We hear of \$120 being bid for the stock on the Street. The output for May shows a falling off of about 50 tons from last year.

Nothing doing in the silver stocks. 3 P. M.—There was a better feeling this afternoon, on the report from London that the American and European committees had adjusted the matter of production. Boston & Montana advanced from 44 to 47 1/2 on quite liberal sales. Butte & Boston sold at \$13 1/2 @ \$13 3/4; Kearsarge at \$13 1/2; Franklin at \$15, and Osceola advanced to 33 1/2. Santa Fe was heavy, and declined to 12 1/2 c.

Chicago. June 1.

(Special Report by Horace M. Johnson, Chicago, Ill.)

Mesaba Range—New England.—This mine now has three pits in ore; No. 1 is 60 ft. deep with 20 ft. of surface and 40 ft. of ore, and still going down in ore; No. 2 is 300 ft. from No. 1, is down 42 ft., 21 ft. of surface and 21 ft. of ore; No. 3 is 300 ft. south of No. 1, and has 19 ft. of surface and 43 ft. of ore, being 62 ft. deep. All the pits are bottomed in ore, and appearances indicate a very large body of good grade ore.

Mesaba Range Mines.—Boston, \$10; Biwabik, \$26; Champion, \$9; Cosmopolitan, \$18; Chicago, \$12; Columbus (fee), \$5.50; Great Northern I. and S. Co., \$1.40; Keystone, \$10; Kanawha, \$17.50; Lake Superior, \$3; Licking, \$5.50; Mesaba Mt., \$17; Mallmann, \$1.40; Mountain Iron, \$55; Washington, \$5.

Gogebic Range Mines.—Ashland, \$49; Germania, \$7; Iron Belt, \$2.40; Metropolitan, \$73; Pence, 50c.; Section "33," \$7.

Marquette Range.—Republican, \$20.

Vermillion Range.—Chandler, \$44.

San Francisco. May 27.

(From our Special Correspondent.)

The sweeping decision of Judge Hebbard in the Hale & Norcross suit has had such a chilling effect that the mining stock market is practically deserted, business being at a standstill. Quite a number of brokers and regular habitués are loud in their denunciations of the Court's ruling, more particularly as they consider it will have a detrimental effect on the stock market. Some color is given to these opinions by the reports current on the street that it having been demonstrated that a "just judge" does sit on the bench in this city, proceedings will be instituted against the directors of the Belcher, Overman and one or two of the other corruptly administered Comstock mining companies. So far, however, these are merely rumors, but it is a "consummation devoutly to be wished" that directors of mining companies be made to disgorge their ill-gotten gains, and that the power of the mill-ring be broken once for all. If such actions at law result to the detriment of the stock market, so much the better. Hitherto it has been but a connecting link in the endless chain of fraud by which the mining harpies preyed upon the public. When the brokers realize that honest methods or extinction is their alternative, it is certain that the modes of conducting business will be changed. Then, and not till then, the stock market will be

worthy the name and no longer a gambling game—a "base" game at that.

To-day the Comstocks were lightly dealt in and prices have had a downward tendency. Consolidated California & Virginia sold for \$4.30, Mexican for \$2, Ophir for \$3.00, Sierra Nevada for \$1.30, Union Consolidated for \$1.30, and Utah for 30c.

Of the Middle Comstocks Hall & Norcross is the only active stock on the list. During the two sessions to-day 1,250 shares sold for \$1.45 @ \$1.60. Best & Belcher ruled at \$2.40, Chollar at 70c., Gould & Curry at \$1.25, Potosi at 90c., and Savage at \$1.40.

The Gold Hill and South End Comstocks are drifting about without any apparent rhyme or reason, and offer only a chance to buyers to "chip" a five-cent profit, and in these degenerate days such insignificant returns are not to be despised. Alta sold this morning for 70c., Alpha, 30c.; Belcher, \$1.05; Bullion, 85c.; Challenge Consolidated, 45c.; Consolidated New York, 60c.; Crown Point, \$1.20; Justice, 10c.; Occidental, 45c.; Overman, 45c.; Silver Hill, 10c., and Yellow Jacket, 70c.

The Tuscaroras have been very quiet during the week as compared to last week. Only scattering sales have been made of these and other outside stocks. Commonwealth has sold for 20c., and Nevada Queen for \$1.30, the latter selling down to \$1.20.

SAN FRANCISCO, June 3.—(By telegraph.)—The opening quotations to-day are as follows: Best & Belcher, \$2.10; Bodie, 30c.; Belle Isle, 20c.; Bulwer, 40c.; Chollar, 55c.; Consolidated California & Virginia, \$3.90; Eureka Consolidated, \$2; Gould & Curry, \$1.10; Hale & Norcross, \$1.35; Mexican, \$1.65; Mono, 45c.; North Belle Isle, 10c.; Navajo, 10c.; Ophir, \$2.85; Savage, \$1.40; Sierra Nevada, \$1.15; Yellow Jacket, 50.

MEETINGS.

Caledonian Gold Mining Company, at the office of the company, No. 300 Montgomery street, San Francisco, Cal., June 7th, at 10 A. M.

Clara Consolidated Gold Mining Company, at the office of the company, No. 309 Montgomery street, San Francisco, Cal., June 7th, at 10:30 A. M.

Crown Point Gold and Silver Mining Company, at the office of the company, No. 331 Pine street, San Francisco, Cal., June 6th, at 1 P. M.

Pinal Consolidated Mining Company, at the office of the company, rooms 20 and 21, No. 309 Montgomery street, San Francisco, Cal., June 7th at 1 P. M.

DIVIDENDS.

Cook's Peak Mining Company, dividend No. 5, of five cents per share, payable June 10th at the office of the company in Colorado Springs, Colo. Transfer books close June 4th and reopen June 11th.

Maryland Coal Company, semi-annual dividend of 1% aggregating \$42,000, payable July 1st, at the office of the company, No. 35 Broadway, New York.

ASSESSMENTS.

COMPANY.	No.	When levied.	D't'nt' in office.	Day of sale.	Amt. per share.
Alpha Cons., Nev.	8	Apr. 14	May 18	June 8	.15
Belcher, Nev.	44	May 17	June 21	July 12	.25
Bullion, Nev.	38	May 24	June 28	July 19	.25
Challenge Consolidated, Nev.	11	May 16	June 20	July 12	.25
Diana, Nev.	8	May 3	June 10	June 30	.08
Golden Prize, Nev.	5	Feb. 29	June 9	June 20	.25
Justice, Nev.	50	May 2	June 6	June 27	.15
Lone Star, Cal.	4	Apr. 2	May 14	June 6	.60 1/2
Mexican, Nev.	45	May 16	June 21	July 12	.25
Modoc Chief, Idaho	4	Jan. 28	May 21	June 13	.02 1/2
Norway, Utah	1	Dec. 24	Feb. 1	July 21	.02
Occidental, Nev.	10	Apr. 6	May 9	May 31	.25
Overman, Nev.	64	May 19	June 22	July 11	.30
Seg. Belcher & Mides, Nev.	10	Apr. 8	May 11	May 31	.25
Siskiyou Cons., Cal.	4	May 14	June 17	July 8	.01 1/2
Summit, Cal.	12	May 20	June 27	July 19	.05
Yellow Jacket, Nev	51	May 9	June 14	July 18	.25

PIPE LINE CERTIFICATES.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.					
	Opening.	Highest.	Lowest.	Closing.	Sales.
May 28.....	55 1/4	55 1/4	55 1/4	55 1/4	5,000
30.....	56 1/4	56 1/4	56 1/4	56 1/4	210,000
31.....	57 1/4	57 1/4	57 1/4	57 1/4	14,000
June 1.....	57 1/4	57 1/4	57 1/4	57 1/4	150,000
2.....	57 1/4	57 1/4	57 1/4	57 1/4	18,000
3.....	57 1/4	57 1/4	57 1/4	57 1/4	18,000
Total sales.....					377,000

COAL TRADE REVIEW.

New York, Friday Evening, June 3d. Statement of shipments of anthracite coal (approximated), for week ending May 28th, 1892, compared with the corresponding period last year:

Regions.	May 28, 1892.	May 30, 1891.	Difference.
	Tons.	Tons.	Tons.
Wyoming Region....	509,943	455,037	Inc. 54,906
Lehigh Region.....	132,438	118,340	Inc. 14,098
Schuylkill Region...	249,798	228,264	Inc. 21,534
Total.....	892,179	801,641	Inc. 90,538
Total for year to date.....	15,328,700	14,184,851	Inc. 1,143,849

PRODUCTION OF BITUMINOUS COAL for week ending May 25th, and year from January 1st.

	1892.		1891.
	Week.	Year.	Year.
EASTERN AND NORTHERN SHIPMENTS.			
Phila. & Erie R. R.	455	36,971	46,872
Cumberland, Md.	72,606	1,435,324	1,715,171
Barclay, Pa.	3,876	83,321	72,960
Broad Top, Pa.	10,405	241,443	219,786
Clearfield, Pa.	77,625	1,567,842	1,775,083
Allegheny, Pa.	24,005	493,920	567,791
Beech Creek, Pa.	42,917	1,063,339	965,994
Pocahontas Flat Top.	50,586	1,015,557	1,011,199
Kanawha, W. Va.	47,884	985,638	950,340
Total	330,359	6,933,355	7,325,196
WESTERN SHIPMENTS.			
Pittsburg, Pa.	24,144	537,693	451,576
Westmoreland, Pa.	39,026	653,956	788,879
Monongahela, Pa.	15,311	225,840	220,203
Total	78,781	1,417,489	1,460,658
Grand total	409,140	8,350,844	8,785,854

PRODUCTION OF COKE on line of Pennsylvania R. R. for the year ending May 25th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 100,759 tons; year, 2,306,824 tons; to corresponding date in 1891, 1,213,347 tons.

Anthracite.

The trade in anthracite is experiencing a period of great quietude. There is nothing of interest to be reported, for everything goes along in a humdrum, uneventful manner. There is but little new business doing, but it is all at the full circular figures.

Evidently, all agitation against the "combination" has not ceased. Last Tuesday Attorney-General Stockton, of New Jersey, said to be acting under the instructions of Gov. Abbot, filed an information praying for an injunction against the Philadelphia & Reading, New Jersey Central and Port Reading Railroad companies, restraining them from transacting any business under the recent leases.

Chancellor McGill has entered a rule returnable June 15 to show cause why the prayers in the information should not be granted, and also granted a preliminary injunction. A stockholders' bill was also filed on behalf of the surviving executors of Stephen Vail containing the same prayers, and asking for an accounting by the Port Reading Company. This bill is filed by the same interests that brought the suit in which the previous lease by the Jersey Central to the Philadelphia & Reading Company was declared illegal.

In relation to the above Chancellor McGill is reported to have stated in an interview:

"The injunction which I have granted acts as a stay against the arbitrary raising of the price of coal until the matter is argued and decided. By the arbitrary raising of the price, I mean that it shall not be raised, pending the proceedings, in the ordinary pursuit of business. The injunction in the Vail case was obtained by the heirs of Stephen Vail, who held 1,400 shares of Jersey Central stock. In 1886 the executors of the State brought suit to set aside the lease made to Reading and they have repeated the same tactics in this case. The order is returnable June 15th."

Governor Abbot is also quoted as saying: "I think the coal combine can be broken. The fight will, however, be long and bitter, and it will probably be the greatest legal contest that New Jersey has ever witnessed. In my opinion the Attorney-General will be able to establish the unconstitutionality of the proceedings of the combine."

On the other hand, according to a reliable news bureau of this city, a good authority on Reading makes the following statement: "The whole question is as to the status of the Port Reading Company. If that company is a New Jersey corporation, and is controlled by residents of that State, it has a right, under the laws of New Jersey, to lease Jersey Central. The State will endeavor to show that Port Reading is a foreign corporation in disguise. Reading lawyers are ready to show that Port Reading is not owned nor controlled by the Reading Company directly or indirectly. Port Reading is owned by a construction company, the majority of whose stock is owned by Mr. Albert Foster. Mr. Foster's ownership is declared to be actual, and it is asserted that he has no contract with Reading or with any other corporation or individual which in any way limits his absolute control of the property. Mr. Foster has, however, been for many years an officer of Reading, and opponents of the company claim that the court will not believe that his ownership is bona fide."

The officers of the Reading company affect indifference as to the result of the actions alluded to above, or else claim that it is nothing but political jobbery. It seems to us rather rash to assert that it is only due to politics that legal steps against the "combine" are to be taken.

Probably little harm will be done to the companies interested by "legal actions," but it is yet to be decided whether the Reading Company will not prove its own worst enemy. This is a thing that time, and time only, can decide.

Despite the preceding, the Reading has had no difficulty in placing the \$2,300,000 of coal land 5% bonds which it recently offered. The proceeds will be devoted to defraying the cost of recent extensions by the railroad.

Bituminous.

The soft coal trade is as quiet as it can possibly be. The same features noted in our last report rule this week. Everybody is shipping on contracts, and coal is moving more freely. New business is so rare that quotations can not be based upon it.

Ocean freights from Baltimore, Newport News and Norfolk are: 80c. to Boston, Salem and Portland; 75c. to Sound ports; 85c. to Portsmouth and Bangor. From Philadelphia freights are 5c. lower. Vessels are abundant at Philadelphia, but scarce at Baltimore. Prices for the best grades of soft coal are as follows: At Newport News and Norfolk, \$2.50; at Baltimore, \$2.50; at Philadelphia, \$2.50; at the Amboys, \$3.10, f. o. b., and \$3.35@3.40 alongside New York. The above prices are for the best grades of coal. Poorer grades may be obtained for less according to their quality.

The rumors of a soft coal war between the Philadelphia & Reading Railroad Company and Pennsylvania, have broken out afresh. Now it is announced in the daily press, of course, that by means of the Beech Creek extension and the Buffalo, Rochester & Pittsburgh Railroad the Reading will be able to compete with the Pennsylvania in this city and in Buffalo. This does not seem very probable that this will materialize. The Reading, it is admitted, can not control by means of the Beech Creek extension more than 1,500,000 tons, which is not material. We do not see what either of the railroads in question will gain by such competition. If any benefit will accrue therefrom, surely it will be to the bituminous trade at large.

The Maryland Coal Company has declared a semi-annual dividend of one per cent., aggregating \$42,000, payable July 1st.

The Reading Coal and Iron Sinking Company, out of the proceeds of the Coal Land Sinking Fund, on July 1st, 1892, will purchase, at par, 13 bonds of the issue known as the "Lee Lands Oak Hill," secured by mortgage executed to John M. Wetherill, January 1st, 1872. Interest will cease upon July 1st.

Boston.

June 2.

(From our Special Correspondent.)

Anthracite coal has lacked life this week. The dealers here all stocked up last month before the advance. The advance in chestnut has had very little, if any, influence on this market, as this is not a chestnut coal consuming district. Prices are held very firm on about all grades.

We quote net prices f. o. b.: Stove, \$4.15; egg, \$3.90; free burning broken, \$3.75; chestnut, \$4.05; Lykens Valley, net at Philadelphia, broken, \$4.50; egg, \$4.90; stove, \$5.40; chestnut, \$4.50.

In bituminous there is very little doing. The consequence is those who want to sell their soft coal are offering inducements in prices. We do not hear of anything under \$3.15 being paid for Clearfield, but George's Creek coal can be easily had for \$3.50.

Freight rates are still firm as vessels are rather scarce.

We quote: From New York to Boston, 65c.@70c.; from Philadelphia to Boston, 75c.; from Philadelphia to Portland, 75c.; to Bath, 80c.; to Providence, 70c.; from Baltimore to Boston, 80c.; Newport News to Boston, 70c.@75c.; Sound points, 70c.

The retail dealers continue to do a very good business. People who are going away for the summer are laying in their supplies, and heavier than usual, since they hear of the proposed advance in July.

Retail dealers are so well stocked with coal that they do not need any more just at present. Should their stocks run down to any extent in the next two or three weeks they are likely to purchase again to have a good stock on hand preparatory to the expected July advance. It must be remembered, however, that April and May were both very busy months, in fact exceptionally so, which would preclude any activity this month in coal.

We quote: Stove, \$6; nut, \$6; egg, \$5.75; furnace, \$5.50; Franklin, \$7.25; Lehigh egg, \$6; Lehigh furnace, \$6. Wharf prices 50 cents less than the foregoing.

The receipts of coal at this port for the week ending May 28 were 55,510 tons of anthracite and 18,363 tons of bituminous, against 33,805 tons of anthracite and 13,718 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 771,943 tons of anthracite and 280,954 tons of bituminous, against 640,020 tons of anthracite and 442,125 tons of bituminous for the same time last year.

Buffalo.

June 2.

(From our Special Correspondent.)

Yesterday the price of coal advanced 25c. per ton on all size of anthracite excepting grate or broken. The quotations are as follows, f. o. b. vessels at Buffalo: \$4.80 for grate and \$5.05 for egg, stove and chestnut; and on cars at Buffalo or Suspension Bridges: \$4.50 for grate and \$4.75 for egg, stove and chestnut, all per 2,200 lbs. At retail here, per 2,000 lbs. screened and delivered, \$5.00 for grate, \$5.25 for stove, egg and chestnut, and \$4.25 for pea. Blossburg unchanged, selling at \$4.00 per 2,000 lbs. The shipments of coal from this port by lake thus far this season aggregate 392,000 net tons, as compared with 422,000 net tons in 1891.

The receipts by canal at Buffalo thus far this season, 143 net tons; the shipments, 6,732 net tons,

Railroad movement of coal, as usual, not reported.

Trade in anthracite light and without any features of interest to report. Bituminous fairly active with prices shaded occasionally to save car service demurrage charges. Coke quiet and steady.

An era of labor troubles has commenced on our docks and discontent prevails among the sailors, lumber shovers and freight handlers to a considerable extent. Our neighboring town of Tonawanda (Buffalo annex), is also experiencing the same difficulties. The result will not be bloodless unless the words of the conservative element are heeded.

The progress of the Philadelphia & Reading case is a topic of interest, but nothing elicited different from what appears in the newspapers regarding the combination and its effects.

Col. J. A. Price, of Scranton, Pa., is collecting and arranging statistics and other information relative to the mining interests of Pennsylvania prior to the year 1868.

A few days ago an advertisement appeared in our local newspapers asking for bids for the necessary quantity of anthracite coal for the use of the almshouse, penitentiary and jail for the current year. The Purchasing Committee reported yesterday that no bids were received, and therefore no awards were made. Several thousand tons are used during the year. The fact of the advance in the price of coal yesterday, and the uniformity in quotations demanded by the local Coal Exchange under heavy penalties, is presumably the reason for the absence of said bids. The committee have decided to leave the matter open for a few days longer.

Lake freights very firm; shippers will not pay higher figures, and many vessels leave light in consequence. At times the scarcity of fuel on the docks prevents the movements by water westward. The shipments from this port from May 26th to 31st, both days inclusive, aggregate 58,720 net tons, distributed about as follows: 15,900 to Chicago, 14,150 to Milwaukee, 6,650 to Duluth, 5,960 to Toledo, 2,250 to Superior, 1,350 to Saginaw, 300 to Bay City, 800 to Manitowoc, 1,300 to Detroit, 460 to Owen Sound and 2,600 to Marquette. The rates of freight were 50c. to Chicago, Milwaukee, Owen Sound, Sault Ste. Marie and Manitowoc; 40c. to Marquette and Saginaw; 30c. to Duluth, Superior and Bay City, and 25c. to Toledo and Detroit, closing with shippers wanting tonnage for Lake Michigan ports, but no vessels were available and but few coal carriers on their way down.

The receipts of coal at this port by canal for fourth week in May were 143 net tons; the shipments 1,695 net tons.

Chicago.

June 2.

(From our Special Correspondent.)

The advance of 25 cents on all sizes but grate, which remains unchanged, has not taken any one by surprise. Coal dealers and the public generally seemed to intuitively feel that it was coming and those who could prepared themselves accordingly. The purchases by retail dealers from yards and docks have been heavy during May, and all available teams have been kept on the "go." It must not be inferred from this that dealers have laid in any large stocks for next season—they have simply covered probable requirements for domestic consumption during June and only the larger trade have done this. Retail demand during the latter part of May was quite active, and a number of consumers of from 10 to 50 tons have bought and, of course, had delivered their respective requirements for next season. In this way many thousands of tons have been withdrawn from the various agents, docks and yards. The jobbing trade begin to realize that their wholesaling business is being practically usurped by the different anthracite coal companies. The general feeling among them is intensely bitter, as they believe that their "glory is departed from them." At the meeting of the Coal Dealers' Association last week the matter was thoroughly discussed, but they concluded they were helpless in the premises as constituted at present. Retail price was fixed at \$6.75, some wanted it advanced to \$7, but the majority voted to make the advance in the same ratio as the Consolidation. Country demand continues light, and although a number of 50-car orders were received by the Reading's agent, most of the business with outside towns is for current needs—there is no stocking up.

Bituminous coal is dull and the present weather is detrimental to any heavy movement. The situation as a whole in soft coal is eminently unsatisfactory; dealers and consumers of steam sizes are pursuing the hand-to-mouth policy. Business, however, is fully as good as it was a year ago, both for Illinois and Indiana coal. The same will apply equally as well to the product of eastern States, Ohio, Pennsylvania and West Virginia. As to prices, the least said the better, as they are what might be expected from a large surplus of any other merchandise, weak and irregular.

Coke is in moderate demand only. The foundry men generally are complaining of the unsatisfactory nature of business, orders are spasmodic and unusually light for the season, notwithstanding which prices are fairly well maintained, and on the Connellsville article they are steady.

Quotations are: \$4.65 furnace; \$5.05 foundry, crushed; \$5.40 Connellsville; West Virginia, \$3.90 furnace, \$2.10 foundry; New River foundry, \$4.90; Walston, \$4.65 furnace, \$5 foundry.

Circular prices are unchanged at the following rates: Lehigh lump, \$6.35; large egg, \$5.35; small

egg, range and chestnut \$5.00. Retail prices per ton are: Large egg, \$6.75; small egg, range and chestnut, \$6.75.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are; Pittsburg, \$3.15; Hocking Valley, \$3; Youghiogheny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.35.

Pittsburg. June 2.

(From our Special Correspondent.)

Coal.—The Ohio River still continues in good navigable order, coal being sent out as fast as a tow can be made up. The week's shipments were: To Cincinnati, 1,344,000 bushels; Louisville, 1,669,000 bushels; total, 3,063,000. The mines in the pools are in full operation; the miners are well satisfied with the situation. The feeling among the parties interested is about all that could be desired. Some months ago, when the railroad miners decided to violate the contract they had made great efforts were made to induce the Monongahela miners to go out with them; they were doing well and proposed to continue to do so. The result was they have had steady employment at 3½c. per bushel, and most of them have saved money. A charter for a new coal company was granted at Harrisburg to the Pacific Coal Company of Pittsburg; capital stock, \$100,000. The incorporators are: Albert J. Gould, W. J. Wood, J. W. Gould, C. L. Suroden and William Moorhead. The company owns several tow boats. The lower markets are well supplied with coal. Prices show no change.

CConnellsville Coke.—Production and shipment fell off last week 242 cars. The active list of ovens show a decrease by the blowing out of certain plants. The main cause of the light production was the poor time which the large companies made. The outlook for the present week shows no improvement. The joint ovens will run but three days, and several works of the Frick company will make but three days. This is due to the unsteady iron trade. There was a slight reaction in Eastern shipments last week; this was hardly due to the reduced freight rates on Eastern coke though. The news of several furnaces banking down in the West caused the Western shipments to drop below those of last week. To Pittsburg and river points there was also a slight drop. There are 11,340 ovens in blast and 5,842 idle. Total estimated production of 104,937 tons. Shipments from the regions for week: To Pittsburg, 1,275 cars; to points east of Pittsburg, 1,900; to points west of Pittsburg, 3,100; total, 6,275. Freights unchanged and so are prices.

METAL MARKET.

NEW YORK, Friday Evening, June 3, 1892.
Prices of Silver Per Ounce Troy.

May.	Sterling Exch'ge.	London.	N. Y. Cents.	Value of sil. in \$1.	June.	Sterling Exch'ge.	London.	N. Y. Cents.	Value of sil. in \$1.
28	1.87½	40½	87½	.676	1	4.88	40½	88¼	.680
30	*				2	4.88	40½	88½	.681
31	1.87½	40½	87½	.679	3	4.88	40½	88¼	.682

*Holiday.

Silver has been firm and advancing past week on London orders. The Government commenced its June purchases last Wednesday and tended to further improve prices. The announcement of Council bills this week showed strength in Indian Exchanges. Some 550,000 ounces have been shipped to London this week.

The United States Assay Office at New York reports the total receipts of silver for the week to be 102,000 ounces.

Silver Bullion Certificates.
NEW YORK STOCK EXCHANGE.

	Prices.		Sales.
	H.	L.	
May 28			
May 30			
May 31			
June 1	88½	88¼	53,000
June 2			
June 3	89	88¾	24,000

Total sales 77,000

Coinage at the Mints of the United States.

The following statement shows the coinage executed at the mints of the United States during May, 1892.

Denomination.	Pieces.	Value.
Double eagles.....	2,500	\$50,000
Eagles.....	278,450	2,784,500
Half-eagles.....	256,220	1,281,100
Total gold.....	537,200	\$4,115,900
Standard dollars.....	510,000	510,000
Half-dollars.....	2,000	1,000
Quarter-dollars.....	1,056,000	264,000
Dimes.....	1,411,700	141,170
Total silver.....	2,979,700	\$916,170
Five cents.....	712,000	35,600
One cent.....	1,160,000	11,600
Total minor.....	1,872,000	\$47,200
Total coinage.....	5,388,000	\$5,079,270

Domestic and Foreign Coin.
The following are the latest market quotations for American and other coin:

	Bid.	Asked.
Trade dollars.....	.70	.75
Mexican dollars.....	.69	.69¾
Peruvian soles and Chilean pesos.....	.65½	.67
English silver.....	4.83	.....
Five francs.....	.93	.95
Victoria sovereigns.....	4.89	4.92
Twenty francs.....	3.89	3.92
Twenty marks.....	4.74	4.76
Spanish doubloons.....	15.55	15.70
Spanish 25 pesetas.....	4.79	4.83
Mexican doubloons.....	15.50	15.70
Mexican 20 pesos.....	19.50	19.60
Ten guilders.....	3.96	4.00
Fine silver bars.....	.88	.88¾

Copper.—During the week just closing the copper market has ruled exceedingly quiet, business having been very limited, with not as much confidence shown in the stability of prices as had been the case. While some of the lake companies are holding out for prices which, at the present time, are above the market generally, Lake copper can be had for delivery all over the year, and has been offered by one of the more prominent mines at 12c., and some second-hand spot ingot copper was even offered at 11-90, the best bid having been 11-85.

Consumption of copper apparently continues quite good, but manufacturers have covered themselves with raw material for some weeks to come, and the anxiety of some holders to realize is therefore not calculated to give the market a firmer tone. Arizona pig copper continues very scarce, most producers being out of the market, while those who are not are holding for too high prices. This description of copper is in a somewhat better position than Lake, as there is continually a good demand from Europe at prices which are better than those obtainable here. Casting copper continues very dull, with offerings at 11½c. in carload lots.

The London market, after declining early in the week from £46 12s. 6d. for spot, and £47@2s. 6d. for futures, the closing figures of last week, to £46 2s. 6d. for spot and £46 10s. for futures, reacted and closes at £46 15s. and £47 2s. 6d. respectively. This change has been caused by the somewhat better success of the combination, which has at last succeeded in getting the Tharsis Company to join in an agreement. While, as a result of this, there may be a further improvement, so far it has been confined to the speculative brands alone, and regular consumers copper is practically unchanged.

However, this may alter, but in the main we continue to claim that prices will finally be adjusted by the supply and the demand, experience having shown, and clearly too, that the market cannot, for any length of time, be artificially controlled. Besides, it will certainly require a better consumptive demand than last year to secure any important rise, as even with the agreement working well, the production will be "limited" to something far in excess of last year's output.

The exports of copper from the port of New York during the past week were as follows:

To Liverpool—	Copper Matte.	Lbs.	\$
S. S. Archimidis.....	1,439 bags	160,573	\$8,000
S. S. Mohawk.....	3,895 "	444,049	30,000
To Liverpool—	Copper.	Lbs.	\$
S. S. Chicago.....	8 billets	1,601	\$188

Tin has steadily advanced here, buyers coming more freely into the market, and against last week's closing prices of 21-55 for spot, June and July, and 21-65 @ 70 for August-December, we quote to-day 21-85 and 22-10 respectively. In spite of this marked advance, we have not gone ahead as rapidly as London, where, from the opening figures of £97 17s. 6d. for spot and £97 10s. for futures, prices have advanced to £100 @ £100 2s. 6d. for spot and £99 10s. @ £99 15s. for three months—these being the closing quotations.

Lead.—The dullness in this metal has become even more pronounced during the week, the demand having fallen off considerably, and offerings having become larger and more pressed, and the Western markets in this respect taking the lead after having for weeks past been far above the parity of prices ruling in the East. While last week no lead could be bought at St. Louis at less than 4-10, to-day the market is practically but a fraction over 4c., with lead offering here at 4-20. But even at this there is very little disposition shown by manufacturers to buy. In London the market is, if anything, a little higher than a week ago.

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows: "Lead dull and hard to place; retail sales, are being made at 4-05c.; sellers are not pressing sales, but are perfectly willing to sell both spot and futures at the above price."

Chicago Lead Market.—The Post, Boynton Strong Company telegraphs us as follows: "The week just past has been quiet and dull. There was but little lead offering and inquiries were not numerous. Values have ruled in the neighborhood of \$4.10½ to \$4.10, with only small sales reported. The trade has been much hampered by the wet weather; notwithstanding this prices remain as given above, showing the intrinsic value of the metal."

Spelter.—The scarcity of spot metal, which prevailed on account of the Western floods, has now ceased, as within the past week enough metal has arrived to satisfy the demand, and the premium, too, has vanished. For any delivery we have to quote, 4-70@4-80.

In London good ordinaries have advanced slightly to £21 12s.; specials at £21 17s. 6d. @ £22; but future deliveries are still as unsalable as ever, at least at anything like satisfactory prices.

Antimony is a little easier in consequence of cables of lower figures from abroad, and we quote Cookson's at 14½@¼c., L. X. at 12½c., and Hallett's at 11½c.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, June 3.

Pig Iron.—For several weeks—if not months—past the reporting of the pig iron market has involved a wearisome repetition of certain facts and features connected with it. It may be said, without fear of contradiction, that the iron market today is in precisely the same condition as it was a month since. The current demand is for small lots only, and consumers exact prompt delivery. Low prices continue, and although a "market" value has been established for some time it is greatly to be doubted whether more than one or two furnaces get the full figure for the product. This has been an open secret in the trade for some time, and we have alluded to it before, but we reiterate this statement in view of the fact that it has been denied by those very people who are doing the selling. Certain it is that no improvement has taken place in any of the pig iron markets since our last report, but it is more than probable that at the present time the production is being curtailed more than ever. We are inclined to believe, however, that before two more months have past the long promised and long-looked for amelioration of the trade will set in. Not that we anticipate any "boom," but it seems reasonable that by August prices will be easier to obtain. No great stocks are now held by consumers, but if their business improves in the fall—as it generally does—then, knowing that bottom prices have been reached, they will doubtless buy in good quantities. In the meantime no heavy business is to be looked for. We quote: Northern No. 1 X, \$16; No. 2 X, \$15; Southern No. 1 X, \$15.50@16; No. 2 X, \$14.50@15.

Spiegeleisen and Ferro-Manganese.—A few unimportant sales are reported. The market continues next to lifeless. Quotations remain nominally as follows: 20% spiegeleisen \$20@27, and 80% ferro-manganese \$61@62.

Steel Rails.—There is no sign of improvement in this market as yet. The dullness of the past few months continues unrelieved and sales of any importance are as scarce as the proverbial hen's teeth. There has been no change in price and we continue to quote: \$30 at mill and \$30.75 tide water.

Rail Fastenings.—We do not hear of anything doing in this market, which continues dull. Nominal quotations are as follows: Fish and angle plates, 1-65@1-70c.; spikes, 1-95@2c.; bolt and square nuts, 2-70@2-80c.; hexagonal nuts, 2-80c.

Merchant Steel.—The market for merchant steel continues quiet. There is no change to report from our last week's account. Ruling quotations are as follows: Musket's special, 48c.; English tool, 15c. net; American tool steel, 6½@7½c.; special grades, 13@18c.; crucible machinery steel, 4-75c.; crucible spring, 3-75c.; open hearth machinery, 2-25c.; open hearth spring, 2-50c.; tire steel, 2-25c.; toe calks, 2-25 @2-50c.; first quality sheet, 10c.; second quality sheet, 8c.

Tubes and Pipes.—Trade in tubes and pipe shows no change from last week. Business has been fair and no change has taken place in prices. We quote ruling discounts as follows: Butt, black, 57½%; butt, galvanized, 47%; lap, black, 67%; lap, galvanized, 55%; boiler tubes, under 3 in. and over 6 in., 55%; 3 in. to 6 in., 60%.

Structural Material.—Although no business of importance can be reported during the past week, manufacturers are beginning to compete for various contracts and the long promised period of activity will commence before long. There has been no change in prices. We quote this week: Beams, 2-30@2-50c.; angles, 2@2-10c.; sheared plates, 1-90 @2c.; tees, 2-40@2-60c.; channels, 2-40@2-50c. Universal plates, 2@2-10c.; bridge plates, 2@2-10c. on dock.

Buffalo. June 2.

(Special report, by Rogers, Brown & Co.)

During the week several more of the large orders which have been under consideration have been closed, leaving, however, a few of the largest still a little short of consummation, for one reason or another.

Although there is no evidence of a reaction, quite a disposition prevails among buyers to cover for their legitimate requirements. This, taken with the regular run of small orders, makes a very large tonnage when the dull times are considered. Prices remain practically unchanged and can be quoted substantially as follows, cash f. o. b. cars, Buffalo.

No. IX. Foundry Strong Coke Iron Lake Superior ore, \$15.75; No. 2X Foundry Strong Coke Iron Lake Superior ore, \$14.75; Ohio Strong Softener No. 1, \$15.75; Ohio Strong Softener No. 2, \$14.75; Jackson County Silvery No. 1, \$17.60; Jackson County Silvery No. 2, \$16.60; Lake Superior Charcoal, \$16.50; Tennessee Charcoal, \$17.00; Southern Soft No. 1, \$14.65; Alabama Car Wheel, \$19; Hanging Rock Charcoal, \$20.50.

Chicago. June 2.

(From our Special Correspondence.)

The iron market is essentially without change, if we may except the more independent tone adopted by the local furnace companies. The recent large sales made by them has created a stronger feeling, and the prices current a month ago are no longer obtainable, and much of the outstanding options have been withdrawn. Southern iron is also firmer, though sales in this direction have been light in consequence. It is still a case of stand-off between buyers and sellers of Lake Superior charcoal iron. Finished iron is probably a little steadier on account of the approaching shut-down of mills July 1st, and although trouble is hinted at by the Amalgamated Association, it will doubtless be smoothed over. Structural steel continues in active inquiry and in better demand than any other form of soft steel just now, but prices are no stronger. The continued strike of the boiler-makers bears hard on the plate trade. Merchant steels and black and steel sheets are active and the outlook good. The Joliet mills are running full on steel billets, wire and rail fastenings. Old material of every description is in the dumps, stocks heavy and prices much demoralized.

Pig Iron.—Further contracts for season's requirements have been closed, which had been pending, buyers having been unable to obtain the concessions in prices which they had hoped for by waiting. There is undeniably a stronger tone to the local coke market, brought about partly by the large sales and the more independent conditions of the furnaces as regards further business, and partly by the recent advance in price made by a number of Southern makers. Southern iron especially has developed an unexpected strength, and heavy buyers are unable to place orders at prices which they declined 30 days ago. The situation in Lake Superior charcoal iron presents no material change; heavy smelters deferring their purchases in anticipation that certain furnaces will be willing to accept \$16 for round lots. Thus far none have been found inclined to meet this price, even for the most desirable portion of the trade. It is an open question what the outcome will be, and rumor has it that one large consumer has now reduced his bid to \$15.75. A Wisconsin charcoal iron maker is seeking an offer for 900 tons of his product, which is made of an inferior ore. Production of this grade of metal is being largely curtailed. Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.50@17; Lake Superior coke, No. 1, \$14.50@15; No. 2, \$14@14.25; No. 3, \$13.75@14; Lake Superior Bessemer, \$16.50; Lake Superior Scotch, \$15.50@16; American Scotch, \$17@17.50; Southern coke, foundry No. 1, \$14.75; No. 2, \$14.25; No. 3, \$13.75; Southern coke, soft, No. 1, \$14; No. 2, \$13.25; Ohio silveries, No. 1, \$17.50; No. 2, \$17; Ohio strong softeners, No. 1, \$17.50; No. 2, \$16.50; Tennessee charcoal, No. 1, \$17.50; No. 2, \$17; Southern standard car wheel, \$20@21.

Steel Billets and Rods.—There is a steady demand for these forms of soft steels, and the product of the steel mills near here is fully absorbed. Billets, 4 x 4, are quoted at \$24.50 Chicago; smaller sizes are \$2@2.50 higher. Steel rods are \$34.50. Freight from Pittsburg is \$2.40, and these prices would be shaded to competitive points.

Structural Iron and Steel.—While demand continues active in all branches, prices are so low that agents of Pittsburg mills are disinclined to quote on round lots for forward delivery. Regular quotations, car lots f. o. b. Chicago, are as follows: Angles, \$1.95@2; tees, \$2.20@2.30; universal plates, \$1.95@2; sheared plates, \$1.95@2; beams and channels, \$2.05@2.25.

Plates.—Demand from outside points is only fair; locally, there is nothing doing on account of the boiler-makers' strike. Steel sheets, 10 to 14, \$2.30@2.40; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.10@2.15; shell iron or steel, \$2.75@3; firebox steel, \$4.25@5.50; flange steel, \$2.75@3.00; boiler rivets, \$4.00@4.15; boiler tubes, 2 1/4 in. and smaller, 55¢; 7 in. and upward, 65¢.

Merchant Steel.—A number of orders from implement men have been placed under contract during the week and others are pending. Tool steel continues active. We quote: Tool steel, \$6.50@6.75 and upward; tire steel, \$2.25@2.30; toe calk, \$2.40@2.50; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.75@1.80; open hearth machinery, \$2.40@2.60; open hearth carriage spring, \$2.25@2.30; crucible spring, \$3.75@4.

Galvanized Sheet Iron.—Demand is fair and the strikers are making some headway, a number of shops having conceded the demands made. Discounts are unchanged at 70 and 10% on Mill lots and 67 1/2 and 5% off on Juniata and 67 1/2 and 10% off on charcoal from warehouse. An extra 2 1/2 to 5% is given on large orders.

Black Sheet Iron.—Some mills have their capacity engaged, and inquiry is active for both iron and steel sheets of the lighter gauges. Quotations are firm at 2.85@2.90c. basis of No. 27 Chicago, for delivery before July 1st. Dealers quote 3@3.10c. from stock.

Bar Iron.—There is a good demand from agricultural implement makers; jobbers are also placing orders for this month's delivery and the market has a better tone. Regular quotations are 1.57 1/2@1.62 1/2c. with half extras added, and 1.65c. for all muck bar. Jobbing orders are quoted at 1.75@1.85c., rates according to quality.

Nails.—Steel cut are in moderate demand at \$1.60, regular average, though some Eastern mills ask

more. Wire nails are less active and some mills have advanced prices to \$1.70 base, Chicago. Jobbing quotations are \$1.65@1.70 from store for cut and wire nails from stock, according to quantity.

Steel Rails.—Inquiries for 500 to 2,500 tons are coming forward in good shape, but there is no great activity. Increased demand is anticipated by mills here when the crops are assured. The orders now received are mostly for quick shipment. Quotations remain unchanged at \$31@32.50. Fastenings and repair material are in fair request at \$1.70 for iron or steel splice bars; spikes, \$2.05@2.15 per 100 lbs.; track bolts, hexagonal nuts, \$2.65@2.70; square, \$2.55.

Scrap.—There is absolutely no market excepting at a sacrifice of values. It is very, very dull, and prices are purely nominal: No. 1 railroad, \$16; No. 1 forge, \$15; No. 1 mill, \$10.50; fish plates, \$18; axles, \$21; horseshoes, \$16.50; pipes and flues, \$7; cast borings, \$6.50; wrought turnings, \$9; axle turnings, \$10.50; machinery castings, \$10; stove plates, \$8.50; mixed steel, \$10.50; coil steel, \$14; leaf steel, \$15; tires, \$15.

Old Material.—Market very quiet for old rails; iron or steel and car wheels are dull. Iron rails are nominally \$18.50, though it is doubtful if \$18 could be obtained. Mixed lengths steel rails \$12 and selected \$13.50; car wheels, \$15@15.25.

Louisville. May 23.

(Special Report by Hall Brothers & Co.)

The market remains essentially without change, and reports for the past two weeks really cover the present situation. Sales are mainly in light quantities, but the aggregate seems to be enough to take the current output of most Southern furnaces, and it is said that stocks in the South are being reduced, one of the large companies having practically no accumulation at all. There is a strong disposition on the part of some of the companies to avoid shading prices any further, but others not so well fixed cannot afford to carry any stock, and as a result shaded prices are often accepted by them.

Hot Blast Foundry Irons.—Southern coke No. 1, \$14@14.25; Southern coke No. 2, \$13@13.25; Southern coke No. 3, \$12.75@13; Southern charcoal No. 1, \$16@17; Southern charcoal No. 2, \$15.50@16; Missouri charcoal No. 1, \$17@17.50; Missouri charcoal No. 2, \$16.50@17.

Forge Irons.—Neutral coke, \$12.50@12.75; cold short, \$12.25@12.50; mottled, \$11.50@12.

Car Wheel and Malleable Irons.—Southern (standard brands), \$20@21; Southern (other brands), \$18.50@19.50; Lake Superior, \$19.50@20.50.

Philadelphia. June 2.

(From our Special Correspondent.)

Pig Iron.—The iron trade is threatened with a still lower range of prices. Considering that there is now scarcely any margin whatever this seems almost out of the question. To-day and yesterday offerings were made of certain well known brands at 25 cents less than any figures heretofore mentioned. Certain makers seem determined to sell, and are only anxious to sell as far ahead as possible at fixed prices. Standard Lake Ore brands of No. 1 Foundry have been offered at \$15.75; standard brands of Forge at \$13.50; Bessemer pig at \$16. Buyers, instead of quickly accepting these offers, are waiting to see whether prices have really touched bottom. The present struggle is to secure a multitude of the large orders which are generally placed this month.

Steel Billets.—Steel billets have sold as low down as \$24.50, near by delivery; at this low figure scarcely any business has been done, but it is thought that within 24 hours it will lead to the placing of some very large orders.

Muck Bars.—Two or three orders have been taken this week at \$24.50 delivered, which is 50 cents under the standard price for the brands sold.

Merchant Iron.—A goodly number of merchant iron orders have been booked since Monday, and it now seems probable that a good many small buyers will cover for July and August. The country price is \$1.65 for what is said to be refined iron.

Sheet Iron.—Both sheet and galvanized iron are moving freely in small lots from store; mill orders are slow to come in. It is stated to-day that a good deal of business has been offered in common galvanized, and some sharp cutting is going on. Discounts will probably be 75%.

Plate and Tank Iron.—Business is made up of very small orders for both iron and steel. Manufacturers are anxious to secure work for the summer, but this week's developments show that buyers are not in the humor to place much business. Tank is 1.75 for steel and iron; steel shell, 2.10; flange, 2.30.

Structural Material.—Bridge plates have been bought at 1.75; angles, 1.80; beams, tees and channels, 2.10.

Wrought Iron Pipe.—Small orders are being booked, but there is no business worth seeking.

Steel Rails.—Steel rail quotations are \$30 at mill, and there is but very little to report.

Old Rails.—Old rails are \$19.50 for iron, and \$16 for steel.

Scrap.—Holders who have accumulated a good deal of No. 1 scrap are holding it at \$18, and are confident that they will get that figure.

Pittsburg. June 2.

(From our Special Correspondent.)

Iron and Steel.—Depression still characterizes the market, but not to the extent that prevailed at

the date of our last report. There are certainly exceptions; for instance, there are buyers in the market for one or two big blocks of soft steel billets, that if consummated will make a good hole in 40,000 tons. This indicates that leading consumers have made up their minds that the present will be a good time to invest, and that prices are not expected to rule below present rates. Taking it all round, the indication of the market is certainly stronger, while leading iron men generally express more confidence in the future.

There has been no decline in raw iron since our last, while the demand is on the increase for standard descriptions. It will be only fair to presume that after stock-taking and July repairs are completed the iron and steel trade will show more activity and better prices. The first matter of importance for the first of July will be arrangement of the wage scale for the coming year; until it is presented nothing will be known what the demands will be. It has been developed that the puddlers in the Amalgamated Association will insist on a new department at the scale convention that meets on Tuesday, June 7. They have entrusted the committee which will represent them with full power in settling the puddling rate for the coming year instead of again conferring after the manufacturers are met with. It is altogether probable that a slight reduction in the matter of puddling will be insisted on, owing to the low price and depression in the iron trade.

It is currently reported that an amicable adjustment of the wages, with but little change, except in the matter above referred to, is anticipated as a result of the convention. A well informed dealer has this to say: "Inquiries are becoming more numerous and sales show up reasonably well in the aggregate, but prices are low and unsatisfactory, with no immediate indications of anything better. The market is in buyers' favor, notwithstanding the fact that current transactions are in excess of those a short time ago, and also that production has shown some decrease—factors which, under most circumstances, would result in a stiffening of prices. While production is still in excess of consumption, the demand for iron and steel products has not increased as rapidly as the capacity of the works; it is largely this disproportion between the demand and supply that causes low prices and gloomy feelings throughout the trade. Although present conditions are unsatisfactory, producers appear to have great confidence in the future.

Southern iron continues to be a disturbing factor, and is pushing Northern competitors in certain markets. It is reported that the low offers made by some of the Southern furnaces a short time ago have been withdrawn and there is not the demoralization in the quotations for the product of these works at the present time." A sale of No. 1 Southern iron is reported at \$14.25, which, after deducting \$3.16 for freight, allows of but \$11.09 for the producer at the furnace. Northern iron men are unable to figure out any profit on sales at this price, but they are not only made but a transaction at \$14 is even hinted at. There is more doing in finished iron, orders are being received more freely.

We are reported the following sales:

Coke Smelted Lake and Native Ores.	
3,500 Tons Bessemer, June, July	\$14.25 cash.
3,000 Tons Bessemer, June	14.15 cash.
2,500 Tons Grey Forge, June, July	12.80 cash.
2,000 Tons Grey Forge, June, July, August	12.75 cash.
2,000 Tons Bessemer, June, July	14.15 cash.
1,500 Tons Grey Forge, June, July	12.85 cash.
1,000 Tons Bessemer	14.30 cash.
1,000 Tons Bessemer, July, August, September	14.25 cash.
750 Tons Grey Forge	12.75 cash.
500 Tons Grey Forge	12.75 cash.
500 Tons Grey Forge	12.75 cash.
500 Tons Grey Forge, August	12.90 cash.
300 Tons Bessemer	14.50 cash.
250 Tons Grey Forge	12.75 cash.
100 Tons No. 2 Foundry	14.00 cash.
100 Tons No. 1 Foundry	15.00 cash.
Charcoal.	
125 Tons Cold Blast, Southern	23.50 cash.
100 Tons Warm Blast	18.00 cash.
50 Tons Cold Blast	26.75 cash.
50 Tons Cold Blast	26.50 cash.
50 Tons No. 3 Foundry	20.00 cash.
25 Tons No. 2 Foundry	21.50 cash.
Steel Billets and Slabs.	
2,500 Tons Steel Billets, July, August	22.50 cash.
2,000 Tons Steel Billets	22.35 cash.
2,000 Tons Steel Billets and Slabs	22.50 cash.
500 Steel Billets, at Mill	22.50 cash.
Muck Bar.	
500 Tons Neutral	25.00 cash.
500 Tons Neutral	24.75 cash.
200 Tons Neutral	24.80 cash.
Skeip Iron.	
800 Tons Narrow Grooved	1.55 4m.
500 Tons Wide Grooved	1.57 1/2 4m.
350 Tons Sheared Iron	1.82 1/2 4m.
Skeip Steel.	
350 Tons Wide Grooved	1.50 4m.
250 Tons Narrow Grooved	1.45 4m.
200 Tons Sheared Steel	1.80 4m.
Ferro-Manganese.	
85 Tons 80%, seaboard	59.30 cash.
Bloom, Beam, R. & C. Ends.	
100 Tons Rail and Bloom Ends	16.40 cash.
Steel Wire Rods.	
650 Tons American Fives at mill	32.00 cash.
Old Iron and Steel Rails.	
1,000 Tons American Ts	20.25 cash.
500 Tons American Ts	20.25 cash.
500 Tons Mixed Steel Rails	15.25 cash.
Scrap Material.	
150 Tons Soft Steel, net	16.50 cash.
100 Tons No. 1 R. R. Scrap, net	16.75 cash.
100 Tons Cast Borings, gross	8.00 cash.
50 Tons Wrought Turnings, net	11.75 cash.

NEW YORK MINING STOCKS QUOTATIONS. DIVIDEND-PAYING MINES. NON-DIVIDEND-PAYING MINES.

Main table of New York Mining Stocks Quotations, including columns for Name and Location of Company, dates from May 28 to June 3, and Sales figures.

*Ex-dividend. †Dealt at in the New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 7,340. Non-dividend shares sold, 18,520. Total shares sold 20,860.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, including columns for Name of Company, dates from May 27 to June 2, and Sales figures.

† Holiday. Dividend shares sold, 6,856. Non-dividend shares sold, 10,366. Total shares sold, 17,222.

COAL STOCKS.

Table of Coal Stocks, including columns for Name of Company, dates from May 28 to June 3, and Sales figures.

† Holiday. Total shares sold, 245,457.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, including columns for Names of Stocks and Closing Quotations from May 27 to June 2.

† Holiday.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par), ASSESSMENTS (Total levied, Date and amount of last), DIVIDENDS (Total paid, Date & amount of last). Rows 1-152.

Table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par), ASSESSMENTS (Total levied, Date and am't of last). Rows 1-152.

G. Gold, S. Silver, L. Lead, C. Copper. * Non-assessable. + This company, as the Western, up to December 10th, 1881, paid \$1,400,000. † Non-assessable for three years. ‡ The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Con. Virginia 10,000,000. ** Previous to the consolidation of the Copper Queen with the Adanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. † This company paid \$190,000 before re-organisation in 1890. ‡ This company acquired the property of the Raymond & Ely Company which had paid \$3,075,000 in dividends.

STOCK MARKET QUOTATIONS.

Aspen. May 30. The closing quotations were as follows:

Table of stock market quotations for Aspen, listing various companies and their prices.

Baltimore, Md. June 2. Bid. Asked.

Table of stock market quotations for Baltimore, Md., listing various companies and their prices.

Pittsburg, Pa. Prices highest and lowest for the week ending June 2:

Table of stock market quotations for Pittsburg, Pa., listing various companies and their prices.

St. Louis. June 1. Closing prices.

Table of stock market quotations for St. Louis, listing various companies and their prices.

Deadwood. May 28. Bid. Asked.

Table of stock market quotations for Deadwood, listing various companies and their prices.

Helena, Mont.

(Special report by SAMUEL K. DAVIS.) Prices highest and lowest for week ending May 28, 1892.

Table of stock market quotations for Helena, Mont., listing various companies and their prices.

Trust Stocks.

Special report by C. I. Hudson & Co., members New York Stock Exchange. The following are the closing quotations June 3:

Table of trust stock quotations, listing various companies and their prices.

Foreign Quotations.

London. May 26.

Table of foreign stock market quotations for London, listing various companies and their prices.

Paris. May 19.

Table of foreign stock market quotations for Paris, listing various companies and their prices.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified.

Table of current prices for various commodities, listing items and their prices.

Powdered, # lb.

Table of powdered commodity prices, listing items and their prices.

THE RARER METALS.

Table of prices for rarer metals, listing various metals and their prices.